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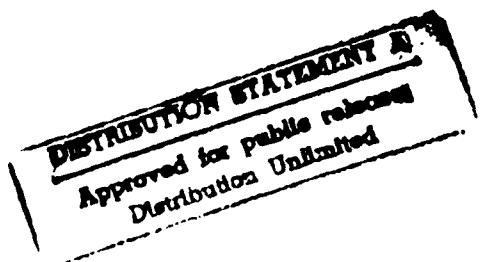
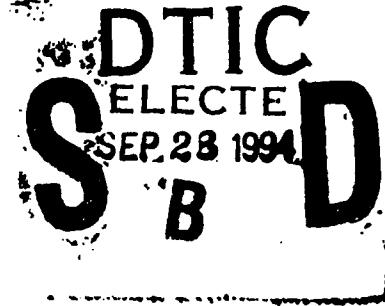
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March 1993

Reuse Library Framework Source Code Release Version 4.1 Version Description Document

Informal Technical Data



STARS-UC-05156/015/00
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1 SCOPE

1.1 Identification

Version Description Document,
Reuse Library Framework (RLF),
Version 4.1,
SunOS Implementation

1.2 System Overview

The Reuse Library Framework (RLF) is an Ada system designed and implemented to support the production and installation of domain-specific software library systems. The RLF is based on two fundamental subsystems: AdaKNET (Ada Knowledge NETwork) and AdaTAU (TAU is an acronym for Think-Ask-Update) which are knowledge representation and inferencing systems derived from systems previously developed by Unisys in Prolog. These subsystems are supported by an integrating framework to allow them to be used in combination with each other. AdaKNET and AdaTAU are also equipped with interface specification languages (Library Model Definition Language (LMDL) and Rule Base Definition Language (RBDL) respectively) that are used to initialize domain models that describe the library (or application) domain. In addition to the support of library systems, the RLF was used to develop a prototype Ada unit test assistant during the STARS Foundations period and has been applied to the representation of software and reuse process models which are themselves machine processable.

Δ 2 RELATED SOFTWARE

In order to build the RLF *Graphical_Browser*, it is necessary to have installed the X Window System Release 4 (X11R4), OSF/Motif version 1.1, SERC Ada/Motif version 1.1, and the STARS Reusable Graphical Browser (RGB) version 1.1. To build the PCTE object management system version of RLF it is also necessary to have installed the Emeraude PCTE implementation version 12.3 and the STARS Ada/PCTE bindings version 0.3.

3 VERSION DESCRIPTION

3.1 Inventory of Contents

This release includes a version of the RLF which can be hosted the UNIX operating system or the Emeraude PCTE implementation. A README files is provided to inform the user of useful places to look for information on RLF documentation and registration. Source code for this version resides in the directory *code*. This directory contains the following subdirectories: *Common*, *Adaknet*, *Adatau*, *Ada-actions*, *Hybrid*, *Library-Manager*, *Rlf-Gb*.

Lmdl, and *Rbdl*. This version also contains *models*, *bin*, and *docs* directories. The contents of these subdirectories are described in the following sections.

The distribution is organized as follows:

```
bin
bin/bitmaps
code
code/Ada_Actions
code/Adaknet
code/Adatau
code/Common
code/Hybrid
code/Library_Manager
code/Lmdl
code/Rbdl
code/Rlf_Gb
docs
docs/manuals
docs/tutorials
models
models/ada_x
models/ada_x/Text
models/ada_x/Text/Widgets
models/ada_x/Text/Xlib
models/ada_x/Text/Xmu
models/ada_x/Text/Xt
models/animals
models/animals/Text
models/asw
models/asw/Text
models/common_data_model
models/common_data_model/Text
models/demo_actions
models/demo_actions/Text
models/demo_actions/Text/sounds
models/demo_actions/Text/xbm
models/window_manager
models/window_manager/Text
models/software_technology
models/software_technology/Text
models/sort_and_search
models/sort_and_search/Text
```

A complete listing of the files in this distribution is included in Appendix A.

3.1.1 Directory: *docs*

The two sub-directories of *docs* contain the RLF manuals and tutorials currently delivered in this RLF release.

3.1.1.1 Sub-directory: *manuals*

3.1.1.1.1 RLF Administrator's Manual. The *RLF Administrator's Manual* provides the information necessary for an RLF reuse library administrator to install, modify, and maintain a reuse library hosted on RLF.

3.1.1.1.2 RLF Installation Guide. The *RLF Installation Guide* informs the user how to install, build and start up the STARS RLF and its user interface applications, namely the RLF *Graphical_Browser* and the RLF *Library_Manager*.

3.1.1.1.3 RLF Modeler's Manual. The *RLF Modeler's Manual* provides the information necessary for an RLF reuse library domain modeler to model, encode, and build an RLF reuse library specification and the library itself. It also defines how to model, encode, and install the RLF library advice modules called "inferencers."

3.1.1.1.4 RLF User's Manual. The *RLF User's Manual* describes the use and basic customization of the *Graphical_Browser* application. The reader is not expected to be a programmer, but familiarity with the UNIX C shell, and basic X Window System operations using the Motif Window Manager (mwm) or some other window manager is assumed. Some explanation of RLF concepts is provided, but only at an elementary level.

3.1.1.2 Sub-directory: *tutorials* This directory contains three Postscript file representations of the contents of three RLF training packages that will be used as hand-out material in support of the delivery of RLF training sessions. While the documents can be read on their own, and are formatted in an article-style format, they are oriented more for a presentation of the material by a speaker using transparencies. The tutorials are also designed to be supplemented by in-class demonstrations of RLF software and the conducting and monitoring of both in-class and out-of-class student exercises using the software.

3.1.1.2.1 RLF User Tutorial. The *RLF User Tutorial* presents a survey of the usage of the RLF *Graphical_Browser* application which will enable new RLF users to quickly learn the user interface and the various RLF features which it presents.

3.1.1.2.2 RLF Administrator Tutorial. The *RLF Administrator Tutorial* provides an introduction to the installation and maintenance of RLF library systems. This tutorial assumes that the user is familiar with the basic RLF interface (for example, as presented in the *RLF User Tutorial*). A survey of the *Library_Manager* application is also presented in the tutorial.

3.1.1.2.3 RLF Modeler Tutorial. The *RLF Modeler Tutorial* provides a thorough presentation of RLF modeling capabilities so that attendees can begin the construction of RLF models for application domains of interest to them. Familiarity with the material covered in the *RLF User Tutorial* is assumed. Modeling techniques are discussed and the use of the RLF model specification languages is taught through the use of a detailed example.

3.1.2 Directory: *bin*

This directory contains the application resource file *RLF_Browser*, the *Graphical_Browser* start-up script *RLF_GB*, a sample RLF start-up file *.rlfrc*, and the associated bitmaps for the *RLF_Browser* file in the sub-directory *bitmaps*. These items are used with the *Graphical_Browser* application, with the *.rlfrc* also being used for the other RLF applications.

Included in the RLF 4.0 release is a *Sndl_to_Lmdl* translator for the conversion of the old SNDL syntax to the LMDL syntax for models.

This directory also contains public domain executables that are used by the sample models included with this release, which are not part of the standard SunOS or X releases. The executables included are *less* and *xloadimage*. In addition, a script called *view_stp.csh* is provided as an example of an RLF action to view a Software Through Pictures(STP) diagram using STP.

The start-up script *RLF_GB* and the sample start-up file *.rlfrc* are included in this document in Appendix B.

3.1.3 Directory: *models*

Sample libraries and their build scripts are found in the *models* directory, which contains the *ada_x*, *animals*, *asw*, *common_data_model*, *demo_actions*, *window_manager*, *software_technology* and *sort_and_search* subdirectories. The contents of these subdirectories are described in the following sections. This directory also contains the file *library_model_template.lmdl*, which contains an example LMDL specification for a library action sub-tree.

3.1.3.1 Sub-directory: *models/ada_x* ...contains the LMDL and RBDL specifications and associated text files for a sample RLF library describing the STARS Ada/Xt system. The specification files must be processed by the LMDL and RBDL translators to build the *ada_x* knowledge base.

3.1.3.2 Sub-directory: *models/animals* ...contains the LMDL specification and associated text files for a sample knowledge base describing a simple animals taxonomy. The specification files must be processed by the LMDL translator to build the animals knowledge base.

3.1.3.3 Sub-directory: *models/asw* ...contains the LMDL specification and associated text files for a sample RLF library addressing the anti-submarine warfare(ASW) domain. The specification files must be processed by the LMDL translator to build the asw library.

3.1.3.4 Sub-directory: *models/common_data_model* ...contains the LMDL specification and associated text files for a sample RLF library illustrating how the Common Data Model defined in the STARS ALOAF document can be expressed using RLF. The specification files must be processed by the LMDL translator to build the common data model library.

3.1.3.5 Sub-directory: *models/demo_actions* ...contains the LMDL specification and associated text files for a sample RLF library addressing the modeling of LMDL actions. The sound actions contained in this library only work on a Sun workstation that has a sound board. The specification files must be processed by the LMDL translator to build the demo_actions library.

3.1.3.6 Sub-directory: *models/window_manager* ...contains the LMDL and RBDL specifications and associated text files for a sample RLF library addressing the SEI's FODA example on move operations in the window manager domain. The specification files must be processed by the LMDL and RBDL translators to build the window_manager library.

3.1.3.7 Sub-directory: *models/software_technology* ...contains the LMDL specification and associated text files for a sample RLF library providing both a functional and product oriented view into the domain and defining numerous attributes for describing software engineering components. The specification files must be processed by the LMDL translator to build the software_technology library.

3.1.3.8 Sub-directory: *models/sort_and_search* ...contains the LMDL and RBDL specifications and associated text files for a sample RLF library describing a sort and search alogorithms domain. The specification files must be processed by the LMDL and RBDL translators to build the sort_and_search library.

3.1.4 Directory: *code*

The *code* directory contains the source code directories, build scripts, and support files needed to construct the RLF.

3.1.4.1 Sub-directory: *code/Common* ...contains low-level data abstractions and utilities shared by the other RLF subsystems. For example, basic set and list abstract data types (ADT's) are located in this directory.

3.1.4.2 Sub-directory: *code/Adaknet* ...contains the source code for the AdaKNET subsystem. AdaKNET is a structured-inheritance knowledge representation system, which may be used as a stand-alone system or in conjunction with AdaTAU. The AdaKNET source makes use of the ADTs in the *Common* directory.

3.1.4.3 Sub-directory: *code/Adatau* ...contains the source for the AdaTAU subsystem. AdaTAU is a rule-based inferencer. Like AdaKNET, it may be used as a stand-alone system. The AdaTAU source makes use of the ADTs in the *Common* directory.

3.1.4.4 Sub-directory: *code/Ada_Actions* ...contains the source for Ada Procedures actions. The ada specifications, bodies and separates may be modified to create unique RLF Ada Procedure actions to be used in library modeling.

3.1.4.5 Sub-directory: *code/Hybrid* ...contains the source code for the hybrid knowledge representation system used by RLF library applications. This hybrid system combines AdaKNET and AdaTAU into an integrated knowledge representation system. The hybrid system source makes use of the AdaKNET and AdaTAU subsystems and the ADTs in the *Common* directory.

3.1.4.6 Sub-directory: *code/Library_Manager* ...contains the source code for the *Library_Manager* application. The *Library_Manager* is designed for a library administrator to have access to update and control an RLF library. The *Library_Manager* code makes use of the AdaKNET, AdaTAU and hybrid knowledge representation systems, and the ADTs in the *Common* directory.

3.1.4.7 Sub-directory: *code/Rlf_Gb* ...contains the source code for the RLF *Graphical_Browser* application. This browser uses SERC Ada/Motif interface to the X Window System. It provides a graphical read-only browsing capability for RLF network models. The *Rlf_Gb* code makes use of the AdaKNET, AdaTAU and hybrid knowledge representation systems. It also requires access to the STARS Reusable Graphical Browser interface.

3.1.4.8 Sub-directory: *code/Lmdl* ...contains the source for the Library Model Definition Language (LMDL) translator. This translator transforms a high-level, non-procedural description of a semantic network knowledge base into an AdaKNET knowledge base. The source code in this sub-directory makes use of ADTs defined in the *Common*, *Adaknet*, and *Hybrid* subdirectories.

3.1.4.9 Sub-directory: *code/Rbdl* ...contains the source for the Rule Base Definition Language (RBDL) translator. This translator transforms a high-level, non-procedural description of a rule-based knowledge base into an AdaTAU knowledge base. The source code in this sub-directory makes use of ADTs defined in the *Common* and *Adatau* subdirectories.

△ 3.2 Changes Installed for Version 4.1

The largest changes in RLF 4.1 from RLF 4.0 is the support for the operation of RLF on top of PCTE in addition to UNIX. Other changes include documentation updates (including UNIX-style *man* pages) and *Library_Manager* application refinement.

△ 3.2.1 The PCTE version of RLF

The following files were added to the *code/Common* directory to support input/output (IO) to either UNIX file systems or PCTE object bases.

```
code/Common/rlf_direct_io.a
code/Common/rlf_direct_io_pcte..a
code/Common/rlf_direct_io_unix..a
code/Common/rlf_sequential_io.a
code/Common/rlf_sequential_io_pcte..a
code/Common/rlf_sequential_io_unix..a
code/Common/rlf_text_io_pcte..a
code/Common/rlf_text_io_pcte.a
code/Common/rlf_text_io_unix..a
code/Common/rlf_text_io_unix.a
```

These packages replace standard Ada IO packages. Environment variables in the build scripts select either the UNIX or PCTE packages for compilation depending on whether UNIX file system or PCTE is being used. As a result of the IO changes, numerous files in the directories *Rlf*, *Lmdl*, and *Rbdl* were modified.

The method of invoking actions via system calls does not work in PCTE. The file *action_invocation_body.a* in the directory *Adaknet* was modified to invoke *esh* shell scripts. This change required changes to Lmdl specifications containing actions. As a result, several

of the sample libraries found in the directory *models* contain two Lmdl specifications to support UNIX and PCTE. The scripts to load the Lmdl specifications will load the appropriate specification.

The package *System_Dependent_Routines* was modified to support PCTE. Separate package bodies for UNIX and PCTE were created. The new files are: *Common/sys_dep_unix.a* and *Common/sys_dep_pcte.a*.

Several files to isolate PCTE and UNIX interface differences were added to the directory *Common*.

```
code/Common/network_constants_pcte.a
code/Common/pcte_invoke_string.a
code/Common/pcte_object_create.a
code/Common/rlf_constants_pcte.a
code/Common/rlf_constants_unix.a
code/Common/rlf_pcte_body.a
code/Common/rlf_pcte_spec.a
code/Common/unix_invoke_string.a
```

Additional scripts for loading sample libraries were added to subdirectories of the *models* directory. These scripts are:

```
models/ada_x/Build_Ada_X_Lib.esh
models/animals/Build_Animals_Lib.esh
models/asw/Build_Asw_Lib.esh
models/common_data_model/Build_Common_Data_Model_Lib.esh
models/demo_actions/Build_Demo_Actions_Lib.esh
models/software_technology/Build_SW_Tech_Lib.esh
models/sort_and_search/Build_SaS_Lib.esh
models/window_manager/Build_Window_Manager_Lib.esh
```

Several files in the *code/Ada_Actions* directory were modified for invoking actions in PCTE. Differences in invocation of actions between PCTE and UNIX are isolated in separate files. The new files in *Ada_Actions* are:

```
code/Ada.Actions/display_attr_action_ascii_sp_pcte.a
code/Ada.Actions/display_attr_action_ascii_sp_unix.a
code/Ada.Actions/display_attr_action_body.a
code/Ada.Actions/display_attr_action_buf_sp_pcte.a
code/Ada.Actions/display_attr_action_buf_sp_unix.a
code/Ada.Actions/display_attr_action_files_sp_pcte.a
code/Ada.Actions/display_attr_action_files_sp_unix.a
code/Ada.Actions/extract_file_sp_pcte.a
code/Ada.Actions/extract_file_sp_unix.a
```

Differences between UNIX and PCTE implementations in the *code/Adaknet* directory are isolated in the files:

```
code/Adaknet/invoke_string_sp_pcte.a
code/Adaknet/invoke_string_sp_unix.a
```

To reduce the amount of PCTE dependent code, the *Gb.Actions* package of the *Graphical_Browser* application was removed and actions invoked from the *Graphical_Browser* now use the action invocation method in the RLF core. The file *Rlf_Gb/gb_actions.a* has been deleted from this release.

A problem compiling generics in the package *GB_CB_Suppress* forced the creation of a separate package containing several generic instantiations. These generic instantiations are now contained in the file *Rlf_Gb/gb_cb_suppress_gen.a*.

Because of the different method for invoking actions in PCTE many of the Lmdl scripts in the *models* directory have been modified. PCTE specific Lmdl specifications have *_pcte* string preceding the *.lmdl* suffix in the UNIX file name. In addition, *esh* scripts used for invoking actions in PCTE have been added to the *Text/* directories, and appear with *.tool* suffix. See the PCTE appendix in the Modeler's Manual for more information on actions in the PCTE version of this release.

3.2.2 Library_Manager Application Refinement

The *Library_Manager* application introduced in RLF 4.0 has been refined in version 4.1 to replace some dynamic menus with scrollable list widgets and to desensitize button choices which would lead to the pop-up of an empty menu. A limit on the number of libraries the *Library_Manager* can process was also removed. All of the *Library_Manager* application files changed:

```
code/Library_Manager/callbacks_body.a
code/Library_Manager/callbacks_spec.a
code/Library_Manager/globals_spec.a
code/Library_Manager/library_manager.a
```

3.3 Adaptation Data

3.3.1 Operating Environment

Sun-4 workstations with a minimum of 8 MB of main memory
SunOS, Version 4.1 or later
X Window System, Version 11, Release 4
OSF/Motif version 1.1

For the RLF/PCTE version include the following:

Emeraude PCTE v12.3
STARS Ada/PCTE bindings version 0.3

3.3.2 Development Environment

Sun-4 workstations with a minimum of 8 MB of main memory
SunOS, Version 4.1 or later
X Window System, Version 11, Release 4
OSF/Motif version 1.1
Sun Ada Version 1.1
SERC Ada/Motif, Version 1.1 for Sun Ada version 1.1
Reusable Graphical Browser, Version 1.1 (Graphical_Browser only)
Emeraude PCTE v12.3
STARS Ada/PCTE bindings version 0.3

3.3.3 Configuration-Unique Data

3.3.3.1 Software Dependencies. The *Graphical_Browser* and *Library_Manager* capabilities require the X Window System, OSF/Motif, SERC Ada/Motif, and Reusable Graphical Browser (RGB) as identified in section 3.3.2. The PCTE version of RLF 4.1 also requires Emeraude PCTE version 12.3 and Paramax STARS Ada/PCTE bindings version 0.3. To obtain the Paramax STARS products, please contact Paramax as recommended in Section 4.

3.3.3.2 OS Dependencies. Small parts of the UNIX version of RLF are dependent upon the underlying operating system. Parts of the PCTE version are dependent on the PCTE implementation and the OS it is hosted on. In the case of RLF 4.1, this would be UNIX. Certain UNIX-specific files are replaced by PCTE versions. These files' names end with *_pcte.a* and *_unix.a*. Some RLF files also process environment variables in possibly a system-dependent manner.

In order to access some UNIX facilities, the Ada *pragma INTERFACE* capability is used to access the 'C' language. This capability can be dependent upon the particular development system being used. The details of this interface are contained in the following files:

```
Common/c_interface_body.a
Common/customIO_body.a
Common/extract_file_sp_pcte.a
Common/invoke_string_sp_pcte.a
Common/invoke_string_sp_unix.a
Common/pcte_invoke_string.a
Common/system_dep_pcte.a
Common/system_dep_unix.a
Common/system_environment_tele_body.a
Common/system_environment_vads_body.a
Common/extract_file_sp_unix.a
Common/rlfrc_scanner_io.a
Common/unix_invoke_string.a

Common/support.c           -- 'C' language functions.
```

3.3.3.3 Defaults. The files *Common/network_constants.a* and *Common/network_constants_pcte.a* define defaults for certain file-naming and file-length conventions. It is unlikely that any modifications to these defaults will be required, however, the installer is advised to review the default definitions to ensure compatibility with overall system limits and conventions.

3.4 Interface Compatibility

3.4.1 Previously Built RLF Libraries

This version of the RLF should be fully compatible with RLF 4.0. Of course, libraries built with the UNIX version of RLF will not be readable by the PCTE RLF, and vice versa.

3.4.2 Libraries Built with Different Compilers

Data representations are different between Ada compilers. As a result, RLF libraries created by a version of the RLF built with one compiler may not be interoperable with libraries created by a version of the RLF built with another compiler.

3.5 Installation and Usage Instructions

The file *Install_RLF_src* is an executable UNIX C shell script, which can be used to build the UNIX version of the RLF from the Ada source code, using the Sun Ada compiler. This script invokes subordinate scripts in the *code* directory, which build individual portions of the software in the proper order. The complete installation and verification procedures are located in the *RLF Installation Guide*. This manual also instructs the user how to build the sample libraries provided with this release.

NOTE: Appendix C contains a listing of the UNIX installation scripts provided in this distribution.

Upon completion of these procedures, the directory defined by the *RLFBIN* variable should contain the following newly built executables:

Graphical_Browser
Library_Manager
Lmdl
Rbdl

3.5.1 Invoking RLF Applications

Once the RLF executables have been built, any of the executables can be run by invoking it by name. Information about invoking the RLF *Graphical_Browser* application is located in the *RLF User's Manual*. Additional information about RLF applications and their uses may be found in the *RLF Modeler's Manual* and the *RLF Administrator's Manual*.

3.6 Potential Problems

3.6.1 System Memory Limitations

Depending on your system configuration, you may encounter Ada compilation or LMDL translation problems stemming from an insufficient amount of memory available to the compiler or translator. One possible solution is to remove any artificial data space limitations during the build by uncommenting the *limit datasize unlimited* and *limit stacksize unlimited* directives in each of the *Build...* scripts. If this modification does not improve the situation, consult your system administrator.

3.6.2 *Graphical_Browser* Known Problems

During the execution of the *Graphical_Browser* a few infrequent errors may occur. The errors listed here are attributed to bugs in Motif version 1.1. It is expected that future versions of Motif will eliminate these errors.

The following is the list of known errors and their descriptions:

1. **Warning: XtRemoveGrab asked to remove a widget not on the list** - This text message, which appears in the originating window, often occurs when a window in the *Graphical_Browser* is exited or canceled.
2. **Menu bar menu relocating to upper left hand corner of the screen** - This event can happen when the Node History menu option, which is in the Navigate View menu bar option, is selected. As the pointer passes over the menu entry the cascading menu may be placed in the upper left hand corner of the screen.
3. **Node menu creation error** - This display alert box randomly appears when a node is selected. If the node is selected again the error usually does not occur. Reselect the node and the correct menu should appear.

3.7 Enhancements

As this is expected to be the last full release of RLF by STARS, not many enhancements are planned for the future under STARS funding. For the basic RLF capabilities, future enhancements might include:

1. An RLF version hosted on a broadcast message server integration back-plane.
2. "Message Pass" type actions used to invoke other tools.
3. Integration with other tools and increased interoperability between the different RLF applications.

4 USER FEEDBACK

This version of RLF is considered an "alpha" release. One of the primary purposes of the release is to encourage experimentation with the software and to solicit feedback from the Ada user community to assist us in improving the product and advancing software reuse. Thus, we would greatly appreciate your comments, suggestions, and criticisms. Although we do not guarantee the applicability of the RLF to particular application needs at this time, we are interested in hearing about successes as well as failures.

We have included three forms in this release which we hope you will use to provide us with needed feedback:

- A registration form (in file *Registration_Form*) that we would like you to fill out and return to us so that we can keep track of our user base and can notify you of product upgrades and other important product news.
- A Program Problem Report (in file *Problem_Report*) that you should use to identify any specific problems you encounter in installing and using the software.
- A New Feature Request (in file *Feature_Request*) that you should use to describe specific enhancements that you believe should be incorporated into the product.

We have established three electronic mailing lists to facilitate RLF usage and feedback:

- **rlf@stars.ballston.paramax.com**

This list provides a public forum for discussing RLF issues. If you ask to be included in this list, you will receive all messages sent to the list and may respond accordingly.

- **rlf-request@stars.ballston.paramax.com**

You should send your completed registration form to this address, as well as requests to be added to or deleted from the rlf list (NOTE: do NOT send add or delete requests to the rlf list itself).

- **rlf-bugs@stars.ballston.paramax.com**

You should send completed Program Problem Reports and New Feature Requests to this address.

If you do not have electronic mail access or wish to send us printed information, please send mail to:

RLF
Paramax STARS Center
12010 Sunrise Valley Drive
Reston, VA 22091

5 NOTES

Both AdaTAU and AdaKNET were designed for independent use by applications requiring knowledge representation and inferencing capabilities. The specification languages provided for these subsystems foster their transfer to diverse application areas and their programmatic interfaces enable their integration into general Ada applications. Additional applications will help determine system shortcomings and lead to their correction.

A Appendix: Inventory of Contents

NOTE: "*" identifies executables; "/" identifies directories

```
..  
Contents.tty  
Install_RLF_src*  
README  
VDDrlf.ps  
VDDrlf.tty  
bin/  
code/  
docs/  
man/  
models/  
  
bin:  
.rlfrc  
RLF_GB*  
  
code:  
Ada_Actions/  
Adaknet/  
Adatau/  
Build_Ada_Libraries.csh*  
Build_Library_Manager.csh*  
Build_Lmdl.csh*  
Build_RLF.csh*  
Build_RLF.var  
Build_Rbdl.csh*  
Build_Rlf_Gb.csh*  
Build_Rlfdi.csh*  
Common/  
Hybrid/  
Library_Manager/  
Lmdl/  
Rbdl/  
Rlf_Gb/  
  
code/Ada_Actions:  
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action_routines_spec.a  
display_attr_action_ascii_sp_pcte.a  
display_attr_action_ascii_sp_pcte.a.last  
display_attr_action_ascii_sp_unix.a  
display_attr_action_ascii_sp_unix.a.last  
display_attr_action_body.a  
display_attr_action_buf_sp_pcte.a  
display_attr_action_buf_sp_pcte.a.last  
display_attr_action_buf_sp_unix.a  
display_attr_action_buf_sp_unix.a.last  
display_attr_action_files_sp_pcte.a  
display_attr_action_files_sp_pcte.a.last  
display_attr_action_files_sp_unix.a
```

```
display_attr_action_files_sp_unix.a.last
display_attr_action_spec.a
display_attributes_sp.a
export_sp.a
extract_action_body.a
extract_action_spec.a
extract_file_sp_pcte.a
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extract_file_sp_unix.a
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extract_sp.a
import_sp.a

code/Adaknet:
action_invocation_body.a
action_invocation_body.a.orig
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action_invocation_spec.a.orig
action_mod_ops_sp.a
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action_predicates_sp.a
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adanet_mod_ops_sp.a
adanet_predicates_sp.a
adanet_query_ops_sp.a
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concept_query_ops_sp.a
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individual_concepts_body.a
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invoke_string_sp_pcte.a
```

```
invoke_string_sp_pcte.a.last
invoke_string_sp_unix.a
invoke_string_sp_unix.a.last
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role_query_ops_sp.a
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rolesets_spec.a
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fact_lists_spec.a
```

```
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fact_parameter_spec.a
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```

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network_constants.a
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objects_spec.a
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pcte_invoke_string.a.last
pcte_object_create.a
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rlf_direct_io_unix.a.last
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rlf_pcte_spec.a
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rlf_sequential_io.a
rlf_sequential_io.a.last
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rlf_sequential_io_pcte.a.last
```

```
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rlf_sequential_io_unix_.a.last
rlf_text_io_pcte.a
rlf_text_io_pcte.a.last
rlf_text_io_pcte_.a
rlf_text_io_pcte_.a.last
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rlf_univ_types.a
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integer_hybrid_states_spec.a
```

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rbdl_parser.a
rbdl_parserdefs.a
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gb_cb_suppress_body.a
gb_cb_suppress_gen.a
gb_cb_suppress_gen2.a
gb_cb_suppress_spec.a
gb_dyn_node_menus_body.a
gb_dyn_node_menus_spec.a
gb_dynamic_menus_body.a
gb_dynamic_menus_spec.a
gb_globals.a
gb_hash.a
gb_history.a
gb_infer.a
gb_infer_dtau_body.a
gb_infer_dtau_spec.a
gb_instance.a
gb_main.a
gb_make_view.a
gb_params_body.a
gb_params_spec.a
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gb_static_cmds_spec.a
gb_static_menus_body.a
gb_static_menus_spec.a
gb_utils_body.a
gb_utils_spec.a

docs:
manuals/
tutorials/

docs/manuals:
AdministratorsManual.ps
AdministratorsManual.tty
InstallationGuide_Binary.ps
InstallationGuide_Binary.tty
InstallationGuide_Source.ps
InstallationGuide_Source.tty
ModelersManual.ps
```

```
ModelersManual.tty
UsersManual.ps
UsersManual.tty

docs/tutorials:
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admin-art.ps
admin-training.tex
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user-training.tex

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ada_x_pcte.lmdl*
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bboard_widget_package.rbdl*
bboard_widget_pkg.rbdl*
command.rbdl*
command_widget_package.rbdl*
command_widget_pkg.rbdl*
composite_object_widget_package.rbdl*
composite_object_widget_pkg.rbdl*
composite_widget_package.rbdl*
composite_widget_pkg.rbdl*
constraint_widget_package.rbdl*
constraint_widget_pkg.rbdl*
core.rbdl*
core_widget_package.rbdl*
core_widget_pkg.rbdl*
dialog.rbdl*
dialog_widget_package.rbdl*
dialog_widget_pkg.rbdl*
form.rbdl*
form_widget_package.rbdl*
form_widget_pkg.rbdl*
label.rbdl*
label_widget_package.rbdl*
label_widget_pkg.rbdl*
manager.rbdl*
manager_widget_package.rbdl*
manager_widget_pkg.rbdl*
object_widget_package.rbdl*
object_widget_pkg.rbdl*
override_shell_widget_package.rbdl*
override_shell_widget_pkg.rbdl*
rect_object_widget_package.rbdl*
rect_object_widget_pkg.rbdl*
scroll.rbdl*
scroll_widget_package.rbdl*
scroll_widget_pkg.rbdl*
shell_widget_package.rbdl*
shell_widget_pkg.rbdl*
simple.rbdl*
simple_widget_package.rbdl*
simple_widget_pkg.rbdl*
text.rbdl*
text_widget_package.rbdl*
text_widget_pkg.rbdl*
```

```
top_level_shell_widget_package.rbdl*
top_level_shell_widget_pkg.rbdl*
transient_shell_widget_package.rbdl*
transient_shell_widget_pkg.rbdl*
vendor_shell_widget_package.rbdl*
vendor_shell_widget_pkg.rbdl*
viewport.rbdl*
viewport_widget_package.rbdl*
viewport_widget_pkg.rbdl*
widget.rbdl*
window_object_widget_package.rbdl*
window_object_widget_pkg.rbdl*
wm_shell_widget_package.rbdl*
wm_shell_widget_pkg.rbdl*

models/animals:
Build_Animals_Lib.csh*
Build_Animals_Lib.esh*
Text/
animals.lmdl*
animals_pcte.lmdl*

models/animals/Text:
del*
dick*
snoopy*
teri*
tim*
xterm_pager.tool*

models/asw:
Build_Asw_Lib.csh*
Build_Asw_Lib.esh*
Text/
asw.lmdl*
asw_pcte.lmdl*

models/asw/Text:
AGP_CommandsSada*
AGP_InputBada*
AGP_InputSada*
AGP_Memory_ManagerSada*
AGP_OutputBada*
AGP_OutputSada*
confirm_panel_package*
dialog_public_a*
dialog_publica*
dialog_publica2*
form_public_a*
form_publica*
viewport_public_a*
viewport_publica*
xterm_int.tool*
xterm_less.tool*
```

```
models/common_data_model:  
Build_Common_Data_Model_Lib.csh*  
Build_Common_Data_Model_Lib.esh*  
Text/  
common_data_model.lmdl*  
common_data_model_pcte.lmdl*  
  
models/common_data_model/Text:  
astronomical_constants_s.a*  
desc_astronomical_constants_s*  
desc_math_interface_sb*  
desc_overpass*  
desc_sat_comp_sb*  
desc_sat_io_b*  
desc_sat_io_s*  
desc_units_s*  
math_interface_sb.a*  
overpass.a*  
restr_as_is_warranty*  
sat_comp_sb.a*  
sat_io_b.a*  
sat_io_s.a*  
units_s.a*  
  
models/demo_actions:  
Build_Demo_Actions_Lib.csh*  
Build_Demo_Actions_Lib.esh*  
Text/  
demo_actions.lmdl*  
demo_actions_pcte.lmdl*  
  
models/demo_actions/Text:  
building*  
general_floorplan*  
imprint.tool*  
lpr.tool*  
message*  
my_floorplan*  
play.tool*  
sounds/  
xbm/  
xloadimage.tool*  
xterm_less.tool*  
xterm_vi.tool*  
  
models/demo_actions/Text/sounds:  
clint_eastwood.au*  
completely_op.au*  
goodcoffee.au*  
kirk_spock_boundary.au*  
klaxton.au*  
mccoy_all.au*  
phasars_3.au*
```

```
photons_3.au*

models/demo_actions/Text/xbm:
Jerry_Bob.xbm*
eye.xbm*
fist.xbm*
full_owl.xbm*
launch.xbm*
lips.xbm*
mandelbrot.xbm*
mandelbrot_seahorses.xbm*
nebula.xbm*
owl_head.xbm*
planet_miranda.xbm*
small_galaxy.xbm*
spock.xbm*

models/software_technology:
Build_SW_Tech_Lib.csh*
Build_SW_Tech_Lib.esh*
SW_Tech_Model_Description.txt*
Text/
sw_tech.lmdl*
sw_tech_pcte.lmdl*

models/software_technology/Text:
bob_pollack*
darpa_isto*
jack_chapman*
karen_roth*
payton_ssags_paper*
pollack_and_loftus*
pollack_mipl_paper*
pollack_tree_transformation_paper*
q13_tools_clc.a*
q13_tools_clc.abs*
q13_tools_clc.con*
q13_tools_clc_build.csh*
q13_tools_clc_test.a*
q9-c300.abs*
q9-c300.con*
q9-c300.doc*
q9-c300.ref*
q9-c300.tem*
q9-c340.abs*
q9-c340.con*
q9-c340.doc*
q9-c340.ref*
q9-c340.tem*
q9-c350.abs*
q9-c350.con*
q9-c350.doc*
q9-c350.ref*
q9-c350.tem*
```

```
q9-c360.abs*
q9-c360.con*
q9-c360.doc*
q9-c360.ref*
q9-c360.tem*
software_a_and_e*
software_technology_inc*
ssags.abs*
ssags.con*
ssags.tem*
vfl_history*

models/sort_and_search:
Build_SaS_Lib.esh*
Build_Sort_And_Search_Lib.csh*
Text/
algorithms.rbd1*
binary_ins.rbd1*
diminishing_inc.rbd1*
exchange_sorts.rbd1*
heapsort.rbd1*
insertion_sorts.rbd1*
internal_sorts.rbd1*
quicksort.rbd1*
selection_sorts.rbd1*
shakersort.rbd1*
shellsort.rbd1*
sort_algorithms.rbd1*
sort_and_search.lmdl*
sort_and_search_pcts.lmdl*
straight_ins.rbd1*
straight_sel.rbd1*

models/sort_and_search/Text:
exchange_sort_desc*
heap_spec_.a*
insertion_sort_desc*
quick_sort_.a*
selection_sort_desc*
shaker_sort_.a*
xterm_less.tool*
xterm_less_int.tool*

models/window_manager:
Build_Window_Manager_Lib.csh*
Build_Window_Manager_Lib.esh*
Text/
move_domain.lmdl*
move_domain.rbd1*
move_domain_pcts.lmdl*
option_move_resize.rbd1*
sunview_move.rbd1*
x10_move.rbd1*
```

```
models/window_manager/Text:  
abort_move.att*  
constrained_move.att*  
expose_after_move.att*  
move_domain_concept.help*  
move_icon.att*  
partially_off_screen.att*  
tiled_layout.descr*  
xterm_less_12.tool*  
xterm_less_40.tool*
```

B Appendix: RLF Start-up Files

B.1 Sample RLF .rlfrc Start-up File

B.1.1 File: .rlfrc

```
1  ---|
2  ---| Sample startup file for the Reuse Library Framework version 4.1
3  ---|
4
5  ---|
6  ---| Library directory or name specifications
7  ---|
8  --library directory : /path/Libraries
9  --library : "Sort and Search Algorithms"
10
11 ---|
12 --| Parameters for the RLF Graphical Browser
13 ---|
14 topology : off
15 cardinality : off
16 layout offset : x : 20
17 layout offset : y : 5
18 history length : 50
19 view type : specialization
20 view depth : relationship : 2
21
22 ---|
23 --| AdaTau inferencing settings
24 ---|
25 advice : explanations : all
26 advice : automatic move : false
27
28 ---|
29 --| Bitmaps for nodes
30 ---|
31 --node bitmap : category : /path/box_m.xbm
32 --node bitmap : category : inferencer : /path/box_I_m.xbm
33 --node bitmap : category : actions : /path/box_A_m.xbm
34 --node bitmap : category : inferencer actions : /path/box_AI_m.xbm
35 --node bitmap : object : /path/cube_m.xbm
36 --node bitmap : object : inferencer : /path/cube_I_m.xbm
37 --node bitmap : object : actions : /path/cube_A_m.xbm
38 --node bitmap : object : inferencer actions : /path/cube_AI_m.xbm
39
40 ---|
41 --| Specification translator settings
42 ---|
43 translator: Lmdl: quiet: no
44 translator: Rbdl: quiet: no
```

B.2 RLF Graphical Browser Start-up Script

B.2.1 Script: RLF_GB

```
1 #!/bin/csh -f
2 #
3 #
4 # RLF_GB - Startup script for the RLF Graphical Browser, v.4.1
5 #
6 # 1.) Check that an X environment is present and running.
7 #
8 # 2.) Ensure the environment variables (RLF_LIBRARIES, DISPLAY, and possibly
9 #       XAPPLRESDIR) are properly set.
10 #
11 # 3.) Invoke the Graphical Browser with all command line arguments specified
12 #       by the user.
13 #
14 # If either an environment variable is not set or incorrectly set or X is not
15 #       running, then abort the script and notify the user of the problem.
16 #
17 #
18
19 echo ""
20 echo " ====="
21 echo " RLF v.4.1 Graphical Browser Startup Script "
22 echo " ====="
23 echo ""
24
25 #
26 # Determine if the DISPLAY environment variable is set;
27 # if it is set, then proceed;
28 # if it is not set, attempt to set it to a meaningful value.
29 #
30 if ( ! $?DISPLAY ) then
31     set host_name = `hostname`
32     setenv DISPLAY ${host_name}:0
33 endif
34
35
36 echo ""
37 echo " Ensure the DISPLAY environment variable is"
38 echo " set correctly; the correct format is <host_name>:0,"
39 echo " where the host_name indicates what CPU your X server "
40 echo " is running on."
41 echo ""
42 echo "Currently, DISPLAY = "
43 echo " $DISPLAY"
44 echo ""
45 set local_host = `echo $DISPLAY | sed 's/.*$//'
46 echo "This means the graphical output will be sent to host: "
47 echo " $local_host"
48 echo ""
49
50 #
```

```
51 # Query the X resource database to determine whether $DISPLAY is valid.
52 #
53 xrdb -query >& /dev/null
54 #
55 #
56 # The DISPLAY environment variable was set incorrectly
57 # if the status is not 0. Notify the user.
58 #
59 if ( ! $status == 0 ) then
60     unsetenv DISPLAY
61     echo ""
62     echo "    There's a problem with your X server."
63     echo "    There's probably no X server running on host 'hostname'."
64     echo "    Determine where your X server is running,"
65     echo "    then issue the following command: "
66     echo ""
67     echo "        setenv DISPLAY <hostname>:0 "
68     echo ""
69     echo "        where <hostname> is the host where your "
70     echo "        X server is running."
71     echo ""
72 endif
73 #
74 #
75 # If RLF_LIBRARIES environment variable not already set, or
76 # incorrectly set exit the script and notify the user.
77 #
78 if ( ! $?RLF_LIBRARIES ) then
79
80     #
81     # Check the command line options to see if the user
82     # specified a library
83     #
84     if ( $#argv >= 2 ) then
85
86         @ index = 1
87
88         while ( $#argv >= $index + 1 )
89
90             @ index2 = $index + 1
91
92             if ( $argv[$index] == "-I" ) then
93                 if ( ( -d $argv[$index2]/Text ) && \
94                     ( -d $argv[$index2]/Taustuff ) ) then
95                     echo "Library directory to be used is $argv[$index2]"
96                     echo ""
97                     goto Library_Found
98             else
99                 echo ""
100                echo "FATAL ERROR:"
101                echo "    The RLF library ($argv[$index2]) you"
102                echo "    indicated from the command line is invalid."
103                echo "    You must set it to a proper RLF library location."
104                echo ""
```

```
105
106         exit(-1)
107
108         endif
109     endif
110
111         @ index++
112
113     end
114
115 endif
116
117 echo ""
118 echo "FATAL ERROR:"
119 echo "    RLF_LIBRARIES is currently unset."
120 echo "    You must set it to the proper location"
121 echo "    or specify a library directory with "
122 echo "    a command line option."
123 echo ""
124
125 exit(-1)
126
127 else if ( ( ! -d $RLF_LIBRARIES/Text) || ( ! -d $RLF_LIBRARIES/Taustuff ) ) then
128
129     echo ""
130     echo "FATAL ERROR:"
131     echo "    RLF_LIBRARIES is incorrectly set."
132     echo "    There are missing elements in the libraries."
133     echo "    You must set it to the proper location."
134     echo ""
135
136     exit(-1)
137
138 endif
139
140 echo "Currently, RLF_LIBRARIES = "
141 echo " $RLF_LIBRARIES"
142 echo ""
143
144 Library_Found:
145
146 #-----
147 # Set other X Window System environment variables (besides DISPLAY).
148 #
149 # Make a couple of guesses as to where the RLF_Browser file resides.
150 # If the RLF_Browser is not found, then alert the user.
151 #
152 if ( ! $XAPPLRESDIR ) then
153
154     No_Browser_File:
155
156     if ( -e RLF_Browser ) then
157
158         setenv XAPPLRESDIR '/bin/pwd'
```

```
159
160     else
161         if ( ! -e /usr/lib/X11/app-defaults/RLF_Browser ) then
162
163             echo ""
164             echo "WARNING: "
165             echo "    Environment variable XAPPLRESDIR is undefined."
166             echo "    You need to find the pathname to the RLF_Browser file."
167             echo "    Then issue the following command:"
168             echo "        setenv XAPPLRESDIR <pathname>"
169             echo ""
170             echo ""
171
172     else
173
174         echo ""
175         echo "You will be using the following RLF_Browser resource file"
176         echo "    /usr/lib/X11/app-defaults/RLF_Browser"
177         echo ""
178         setenv XAPPLRESDIR /usr/lib/X11/app-defaults
179
180     endif
181
182     endif
183
184 else
185     if ( ! -e $XAPPLRESDIR/RLF_Browser ) then
186
187         goto No_Browser_File
188
189     endif
190
191 endif
192
193 #-----
194 # Check if a "bitmaps" directory resides beneath $XAPPLRESDIR.
195 #-----
196 if ( $?XAPPLRESDIR ) then
197     echo ""
198     echo "Currently, XAPPLRESDIR = "
199     echo "    $XAPPLRESDIR"
200     echo ""
201
202     if ( ! -d $XAPPLRESDIR/bitmaps ) then
203         echo ""
204         echo "WARNING: "
205         echo "    Bitmaps directory not found:"
206         echo "    $XAPPLRESDIR/bitmaps was not found."
207         echo ""
208         echo "    The RLF Graphical Browser will not be able to display"
209         echo "    its bitmaps for the graph nodes.  This may make the"
210         echo "    graph display less aesthetically pleasing."
211         echo ""
212         echo "    The 'bitmaps' directory should exist as a subdirectory"
```

```
213      echo "      from the location of the 'RLF_Browser' file."
214      echo "      (This is a Motif limitation.)"
215      echo ""
216      endif
217  endif
218
219 #-----
220 # If the user has not already defined the environment variables
221 # RLF_PAGER and RLF_EDITOR, the script will default the to be
222 # "more" and "vi", respectively.
223 #-----
224 if ( ! $?RLF_PAGER ) then
225     setenv RLF_PAGER    more
226 endif
227
228 if ( ! $?RLF_EDITOR ) then
229     setenv RLF_EDITOR   vi
230 endif
231
232 echo ""
233 echo "RLF_PAGER = $RLF_PAGER"
234 echo "RLF_EDITOR = $RLF_EDITOR"
235 if ( ! $?RLF_WORKING_DIR ) then
236     echo ""
237     echo "RLF_WORKING_DIR undefined, so default to current working directory."
238     echo ""
239     setenv RLF_WORKING_DIR `pwd`
240 endif
241 echo "RLF_WORKING_DIR = $RLF_WORKING_DIR"
242 echo ""
243
244 #-----
245 # Invoke the RLF Graphical_Browser with any command line arguments
246 # entered by the user.
247 #-----
248 echo ""
249 echo "Starting the RLF Graphical Browser..."
250 echo ""
251 Graphical_Browser $argv
```

C Appendix: Installation Scripts

C.1 SunAda Support File

C.1.1 File: Build_RLF.var

```
1 #-----  
2 #  
3 # Build_RLF.var - RLF software installation configuration file.  
4 #  
5 #-----  
6  
7 setenv COMPILERNAME SunAda  
8  
9 #  
10 # Directory for installation of the RLF Graphical Browser resource file  
11 # and the bitmaps sub-direcory.  
12 # Note: You usually need root privilege to write in this directory,  
13 # Installation of the resource file and the bitmaps sub-directory will fail  
14 # if write permission is denied.  
15 #  
16 setenv APPDEFAULTS /afs/stars.reston.unisys.com/work/rlf/app-defaults  
17  
18 #  
19 # Uncomment and edit these lines if you do not want to  
20 # be prompted for the environment variables  
21 #  
22  
23 setenv RLFHOME /afs/stars.reston.unisys.com/test/rlf/4.1  
24  
25 setenv COMPILERPATH /compiler/sunada_1.1  
26  
27 setenv RGB /afs/reston/test/rgb/1.1/Build_Sun4/SunAda1.1/rgb  
28  
29 setenv ADAMOTIFHOME /testbed_4/sercx11a  
30  
31 setenv BUILD_SAMPLE_LIB Y  
32  
33 setenv LIBX /usr/lib/libX11.a  
34 setenv CC /bin/cc  
35  
36 #  
37 # Uncomment and edit these lines for building on PCTE  
38 #  
39  
40 setenv LIBEMER /testbed/emer/bin/lib/libemer.a  
41 setenv PCTE_ADA /afs/reston/test/for_PCTE/adapcte/0.3/Build_Sun4/SunAda1.1  
42  
43 setenv PCTE_UTIL $PCTE_ADA/util.o  
44 if ( ! $?PCTE ) setenv PCTE N  
45  
46 #  
47 # If you really don't want to build the browser, set to N.
```

```
48 #
49 setenv BUILD_RLFGB Y
50
51 #
52 # Uncomment (but do not edit) these lines.
53 #
54 setenv RLFHOME $RLFHOME/bin
55
56 if ( $PCTE == Y ) then
57     setenv RLFBINDEST $RLFHOME/pcte/bin
58     if ( ! -d $RLFHOME/pcte ) mkdir $RLFHOME/pcte
59     if ( ! -d $RLFHOME/pcte ) mkdir $RLFHOME/pcte/bin
60 else
61     setenv RLFBINDEST $RLFHOME/unix/bin
62     if ( ! -d $RLFHOME/unix ) mkdir $RLFHOME/unix
63     if ( ! -d $RLFHOME/unix/bin ) mkdir $RLFHOME/unix/bin
64 endif
65
66 setenv RLFCODE $RLFHOME/src_rel/code
67
68 if ( $PCTE == Y ) then
69     setenv TARGET $RLFHOME/pcte/build_sunada1.1
70     if ( ! -d $RLFHOME/pcte ) mkdir $RLFHOME/pcte
71 else
72     setenv TARGET $RLFHOME/unix/build_sunada1.1
73     if ( ! -d $RLFHOME/unix ) mkdir $RLFHOME/unix
74 endif
75 setenv RLF_LIBRARIES $RLFHOME/unix/Libraries
76
77
78 #-----
79 # END OF REQUIRED EDITING FOR BATCH MODE
80 #-----
81
82 #
83 # Define the location of RLFHOME
84 #
85 setRLFHOME:
86 if ( $?RLFHOME == 0 ) then      # if NOT set
87     echo ""
88     echo "Specify path to top-level RLFHOME directory "
89     echo "-----"
90     echo " Examples: "
91     echo "      /mybase/RLF "
92     echo "      /afs/myhome/see/rif "
93     echo "      /usr/tools/rif "
94     echo "      etc. "
95     echo ""
96     echo ""
97     echo -n " RLFHOME = "
98     set noglob
99     setenv RLFHOME $<
100    echo ""
101 endif
```

```
102
103 if ( $RLFHOME == "" ) then
104   unsetenv RLFHOME
105   goto setRLFHOME
106 endif
107
108 if ( ! -e $RLFHOME ) then
109   echo ""
110   echo "T*** $RLFHOME does not exist ***"
111   echo "*** Please try again. ***"
112   echo ""
113   unsetenv RLFHOME
114   goto setRLFHOME
115 else
116   if ( $?RLFBIN == 0 ) setenv RLFBIN $RLFHOME/bin
117   if ( $?RLFCODE == 0 ) setenv RLFCODE $RLFHOME/code
118 endif
119
120 echo ""
121 echo "      RLFHOME = $RLFHOME"
122 echo "      RLFBIN = $RLFBIN"
123 echo "      RLFBINDEST = $RLFBINDEST"
124 echo "      RLFCODE = $RLFCODE"
125 echo ""
126
127 #
128 # Establish a path to the compilation system.
129 #
130 setCOMPILERPATH:
131
132 if ( $?COMPILERPATH == 0 ) then
133   echo ""
134   echo "Specify path to the SunAda compiler "
135   echo "-----"
136   echo " Examples: "
137   echo "      /compilers/sunada_1.1"
138   echo "      /usr/bin/sunada"
139   echo "      etc."
140   echo ""
141   echo -n " COMPILERPATH = "
142   setenv COMPILERPATH $<
143   echo ""
144 endif
145 if ( ( $COMPILERPATH == ) || ( ! -e $COMPILERPATH/bin/ada ) ) then
146   echo ""
147   echo "*** Cannot find Ada compiler in $COMPILERPATH/bin ***"
148   echo "*** Please try again. ***"
149   unsetenv COMPILERPATH
150   goto setCOMPILERPATH
151 else
152   setenv COMPILERBIN $COMPILERPATH/bin
153   setenv COMPILE      "$COMPILERBIN/ada -v "
154   setenv LINK        "$COMPILERBIN/a.1d -v "
155   setenv LINK_FLAGS  ""
```

```
156  endif
157
158
159 #
160 # Define the destination of the RLF build.
161 #
162 if ( $?TARGET == 0 ) then
163   echo ""
164   echo "Specify directory where the RLF Ada libraries will be built"
165   echo "-----"
166   echo ""
167   echo "      1. $RLFHOME/Build_${COMPILERNAME} "
168   echo "      2. Let me specify the target build directory."
169   echo "      3. Exit. "
170   echo ""
171
172 setTARGETDIR:
173 #
174 # Read input from user.
175 #
176 set answer = 0
177 echo -n "Please enter 1, 2, or 3 > "
178 set answer = ( $< )
179 set answer = ( $answer )
180 set answer = $answer[1]
181
182 Get_Valid_Input:
183 while ( $answer[1] != 1 && $answer[1] != 2 && $answer[1] != 3 )
184   echo ""
185   echo "T*** Invalid input. Please try again. ***"
186   echo ""
187   echo -n "Please enter A NUMBER: 1, 2, or 3 > "
188   set answer = ( $< )
189   set answer = ( $answer )
190   set answer = $answer[1]
191
192 end
193 while ( $answer < 1 || $answer > 3 )
194   echo ""
195   echo "T*** Invalid input. Please try again. ***"
196   echo ""
197   echo -n "Please enter 1, 2, or 3 > "
198   set answer = ( $< )
199   set answer = ( $answer )
200   set answer = $answer[1]
201 end
202
203 echo ""
204 echo "You chose: $answer"
205
206 switch ( $answer )
207   case 1:
208     setenv TARGET $RLFHOME/Build_${COMPILERNAME}
209     breaksw
```

```
210      case 2:
211          echo -n " TARGET = "
212          setenv TARGET $<
213          echo ""
214          breaksw
215      case 3:
216          unsetenv TARGET
217          echo ""
218          echo \
219          "*** Sorry, a target build directory must be specified ***"
220          echo ""
221          exit 0
222          breaksw
223      default:
224          echo "I*** Invalid input value ***"
225          echo "*** Please try again ***"
226          echo ""
227          goto setTARGETDIR
228      endsaw
229
230      #
231      # Check for null entry
232      #
233      if ( $TARGET == "" ) then
234          setenv TARGET $RLFHOME/Build_${COMPILERNAME}
235      endif
236  endif
237
238      #
239      # By default, use /bin/cc for the C compiler.
240      #
241      if ( $?CC == 0 ) then
242          if ( -e /bin/cc ) then
243              setenv CC /bin/cc
244          else
245              unsetenv CC
246          endif
247      endif
248
249      #
250      # Establish a path to the C compiler.
251      #
252      setCC:
253
254      if ( $?CC == 0 ) then
255          echo ""
256          echo "Specify path to the C compiler (e.g., /bin/cc)"
257          echo ""
258          echo -n " CC = "
259          setenv CC $<
260          echo ""
261      endif
262      if ( ! -e $CC ) then
263          echo ""
```

```
264     echo "*** Cannot find C compiler $CC ***"
265     echo "*** Please try again. ***"
266     unsetenv CC
267     goto setCC
268  endif
269  echo ""
270  echo "Using the following C compiler: $CC"
271  echo "-----"
272
273
274  #
275  # The following environment variables identify the directories
276  # required to build the RLF Graphical Browser.  This requires the
277  # SERC Ada/Motif and Reusable Graphical Browser software.
278  #
279
280  setLIBX:
281      if ( $?LIBX == 0 ) then
282          echo ""
283          echo "Specify pathname of the X11 Xlib object archive "
284          echo "-----"
285          echo " Examples: "
286          echo " /usr/lib/libX11.a"
287          echo ""
288          echo -n " LIBX = "
289          setenv LIBX $<
290          echo ""
291      endif
292      if ( $LIBX == ) goto setLIBX
293      if ( ! -e $LIBX ) then
294          echo ""
295          echo "T*** $LIBX does not exist ***"
296          echo "*** Please try again. ***"
297          echo ""
298          unsetenv LIBX
299          goto setLIBX
300      endif
301
302  setADAMOTIFHOME:
303      if ( $?ADAMOTIFHOME == 0 ) then
304          echo ""
305          echo "Specify path to the SERC Ada/Motif software home directory "
306          echo "-----"
307          echo " Examples: "
308          echo " /mybase/adamotif1.0/sercx11 "
309          echo " /sercx11 "
310          echo " etc."
311          echo ""
312          echo -n " ADAMOTIFHOME = "
313          setenv ADAMOTIFHOME $<
314          echo ""
315      endif
316      if ( $ADAMOTIFHOME == ) goto setADAMOTIFHOME
317      if ( ! -e $ADAMOTIFHOME ) then
```

```
318     echo ""
319     echo "T*** $ADAMOTIFHOME does not exist ***"
320     echo "*** Please try again. ***"
321     echo ""
322     unsetenv ADAMOTIFHOME
323     goto setADAMOTIFHOME
324     endif
325
326 setRGB:
327     if ( $?RGB == 0 ) then
328         echo ""
329         echo "Specify path to the RGB Ada libraries "
330         echo "-----"
331         echo " Examples: "
332         echo "    /mybase/browser/Build_Sun4/rgb "
333         echo "    /afs/myhome/see/rgb/1.0/Sun4/rgb "
334         echo "    etc. "
335         echo ""
336         echo -n "  RGB = "
337         setenv RGB $<
338         echo ""
339     endif
340     if ( $RGB == ) goto setRGB
341     if ( ! -e $RGB ) then
342         echo ""
343         echo "T*** $RGB does not exist ***"
344         echo "*** Please try again. ***"
345         echo ""
346         unsetenv RGB
347         goto setRGB
348     else
349         if ( -e $RGB/call_ada.o ) then
350             setenv RGB_OBJ $RGB/call_ada.o
351         else
352             echo ""
353             echo "T*** Cannot find $RGB/call_ada.o ***"
354             echo "*** Please try again. ***"
355             unsetenv RGB
356             goto setRGB
357         endif
358     endif
359
360 #
361 # The following environment variable determines whether the sample animals
362 # model will be built and if so sets up the RLF_LIBRARIES environment
363 # variable.
364 #
365 if ( ! $?BUILD_SAMPLE_LIB ) then
366     echo ""
367     Get_Valid_Build_Lib_Input:
368     echo ""
369     echo "Specify sample library build decision "
370     echo "-----"
371     echo ""
```

```
372 echo " Do you wish to translate the sample RLF library Animals "
373 echo -n " after the source code build? (y/n) > "
374 #
375 # Read input from user.
376 #
377 set answer = 0
378 set answer = ( $< )
379 set answer = ( $answer )
380 set answer = $answer[1]
381
382 if ( $answer[1] != y && $answer[1] != Y && \
383     $answer[1] != n && $answer[1] != N ) then
384     echo ""
385     echo "T*** Invalid input. Please try again. ***"
386     echo ""
387     echo -n "Please enter y or n "
388     echo ""
389     goto Get_Valid_Build_Lib_Input
390 else
391     setenv BUILD_SAMPLE_LIB $answer
392 endif
393 endif
394
395 if ( $BUILD_SAMPLE_LIB == y || $BUILD_SAMPLE_LIB == Y ) then
396     setenv BUILD_SAMPLE_LIB Y
397     if ( ! $?RLF_LIBRARIES ) then
398         setenv RLF_LIBRARIES $RLFHOME/Libraries
399     endif
400     echo ""
401     echo " BUILD_SAMPLE_LIB = $BUILD_SAMPLE_LIB"
402     echo "     RLF_LIBRARIES = $RLF_LIBRARIES"
403     echo ""
404 else
405     setenv BUILD_SAMPLE_LIB N
406     echo ""
407     echo " BUILD_SAMPLE_LIB = $BUILD_SAMPLE_LIB"
408     echo ""
409 endif
410
411
412 echo ""
413 echo "         TARGET = $TARGET"
414 echo ""
415 echo "         COMPILERNAME = $COMPILERNAME"
416 echo "         COMPILERPATH = $COMPILERPATH"
417 echo "         COMPILERBIN = $COMPILERBIN"
418 echo "         COMPILE = $COMPILE"
419 echo "         LINK = $LINK"
420 echo "         LINK_FLAGS = $LINK_FLAGS"
421 echo "         CC = $CC"
422 echo ""
423 echo "         RGB = $RGB"
424 echo "         RGB_OBJ = $RGB_OBJ"
425 echo ""
```

```
426 echo "          LIBX = $LIBX"  
427 echo "          ADAMOTIFHOME = $ADAMOTIFHOME"  
428 echo ""
```

C.2 SunAda Scripts for Installing RLF

C.2.1 Script: Install_Rlf_src

```
1  #! /bin/csh -f
2  #
3  # Install_RLF - C Shell script to install RLF software.
4  #
5  # Usage: Install_RLF
6  #
7  set config_file = "code/Build_RLF.var"          # name of installation
8                                # configuration file
9  set interactv_install = "code/Build_RLF.csh"    # name of interactive
10                             # installation file
11
12
13  stty ignbrk                                # ignore break on input
14  stty -brkint                                # don't signal SIGINT on break
15
16  set cmdname = $0
17  if ( $#argv != 0 ) then                      # check cmd line usage
18      echo "Usage: $cmdname:t"                  # print only tail of cmd name
19      exit
20  endif
21
22  clear
23
24  cat << X_SCREEN_X
25
26  +-----+
27  |
28  |          RLF 4.1 Installation Script
29  |          Source Code Release
30  |
31  +-----+
32
33  You must choose one of the following installation options:
34
35
36      1) Interactive installation
37
38          * You are prompted for all necessary
39          configuration values (i.e., pathnames).
40
41
42      2) Edit the file that contains the configuration values
43
44          * You edit the file "Build_RLF.var" and
45          set the configuration values appropriately
46          for your site.
47
48
49      3) EXIT this script.
50
```

```
51
52
53     (If you do not edit the "Build_RLF.var" file, or specify
54     invalid values, you will be prompted for the configuration
55     values anyway.)
56
57
58     Which installation option do you prefer?
59
60 X_SCREEN_X
61
62 #
63 # Read input from user.
64 #
65 set answer = 0
66 echo -n "Please enter 1, 2, or 3 > "
67 set noglob
68 set answer = ( $< )
69 set answer = ( $answer )
70 set answer = $answer[1]
71 unset noglob
72
73 Get_Valid_Input:
74     while ( $answer[1] != 1 && $answer[1] != 2 && $answer[1] != 3 )
75         echo ""
76         echo "I*** Invalid input. Please try again. ***"
77         echo ""
78         echo -n "Please enter A NUMBER: 1, 2, or 3 > "
79         set answer = ( $< )
80         set answer = ( $answer )
81         set answer = $answer[1]
82
83     end
84     while ( $answer[1] < 1 || $answer[1] > 3 )
85         echo ""
86         echo "I*** Invalid input. Please try again. ***"
87         echo ""
88         echo -n "Please enter 1, 2, or 3 > "
89         set answer = ( $< )
90         set answer = ( $answer )
91         set answer = $answer[1]
92     end
93
94 echo ""
95 echo "You chose: $answer[1]"
96
97 #
98 # Process input, execute appropriate procedure.
99 #
100 switch ( "$answer[1]" )           # look at char
101     case [1]:                   # Interactive
102         echo ""
103         echo "+-----+"
104         echo "| Executing interactive installation script. |"
```

```
105      echo "+-----+"
106      echo ""
107      echo "Build the UNIX or the PCTE version of RLF?"
108      echo " (The default is UNIX.)"
109      echo ""
110      echo " 1. UNIX"
111      echo " 2. PCTE"
112      echo ""
113
114      #
115      # Read input from user.
116      #
117      set reply = 0
118      echo -n "Please enter 1 or 2 > "
119      set noglob
120      set reply = ( $< )
121      set reply = ( $reply )
122      set reply = $reply[1]
123      unset noglob
124
125      Get_Valid_Input:
126      while ( $reply[1] != 1 && $reply[1] != 2 )
127          echo ""
128          echo "**** Invalid input. Please try again. ****"
129          echo ""
130          echo -n "Please enter A NUMBER: 1 or 2 > "
131          set reply = ( $< )
132          set reply = ( $reply )
133          set reply = $reply[1]
134
135      end
136      while ( $reply[1] < 1 || $reply[1] > 3 )
137          echo ""
138          echo "**** Invalid input. Please try again. ****"
139          echo ""
140          echo -n "Please enter 1 or 2 > "
141          set reply = ( $< )
142          set reply = ( $reply )
143          set reply = $reply[1]
144      end
145
146      echo ""
147      echo "You chose: $reply[1]"
148
149      pushd code > /dev/null
150
151      #
152      # Invoke the build script with the appropriate argument.
153      #
154      unset noglob
155      if ( $reply[1] == 1 ) then
156          setenv PCTE N
157          echo "Building the UNIX version."
158
```

```

159          $interactv_install
160
161      else
162          setenv PCTE Y
163          echo "Building the PCTE version."
164
165          $interactv_install -pcte
166
167      endif
168
169      popd > /dev/null
170      breaksw
171
172  case [2]:          # Edit the 'var' file
173      #
174      # Calculate string lengths for proper display.
175      #
176      set beginning = "      |           $config_file"
177
178  @ line = `expr length "      +-----+"
179  @ remainder = $line - `expr length "$beginning"
180
181      echo ""
182      echo "      +-----+"
183      echo "      | To build the Reuse Library Framework in batch mode, |"
184      echo "      | you must edit the installation configuration file: |"
185      echo "      |"
186
187      set ctr = 1
188
189      set line = "${beginning}"
190      while ( $ctr < $remainder )
191          set line = "${line} "
192          @ ctr = $ctr + 1
193
194      end
195      echo -n "$line"
196      echo "|"
197      echo "|"
198      echo "| Then execute the command:           |"
199      echo "|"
200      echo "| Build_RLF.csh >& LOG &           |"
201      echo "|"
202      echo "| Once the job is finished, check the LOG file for      |"
203      echo "| errors.           |"
204      echo "|"
205      echo "+-----+"
206
207  case [3]:          # Exit
208      echo ""
209      echo "Exiting installation script."
210      breaksw
211
212  case [!%]:
```

```
212     echo ""
213     echo "Pathological input."
214     echo "Of course C shell scripts are breakable, please be kind."
215     echo "T"
216     exit -1
217     breaksw
218
219     default:
220         # if here, something's wrong
221         echo "*** Invalid input. ***"
222         goto Get_Valid_Input
223         breaksw
224     endsw
225
226
227 echo ""
228 exit 1
229
230
```

C.2.2 Script: Build_RLF.csh

```
1 #!/bin/csh -f
2 #
3 #
4 # Build_RLF.csh - C Shell script to build the source code release
5 #                   of the RLF software.
6 #
7 #
8 #      Usage:
9 #            Build_RLF.csh [-pcte] [-link_only]"
10 #
11 #
12 #
13 # Uncomment the following two lines if you need to increase the
14 # system resources on your host; else ignore.
15 #
16 #####limit stacksize unlimited
17 #####limit datasize unlimited
18 #
19 #
20 # RLF v.4.2 -- argument processing.
21 #
22 if ( $#argv > 2 ) then
23     echo ""
24     echo "${prog:t}: Only 2 arguments maximum are allowed."
25     echo ""
26     goto USAGE
27 endif
28 #
29 #
30 # These are the default settings -- build for UNIX; LINK_ONLY is false.
31 #
32 setenv PCTE N
33 setenv LINK_ONLY N
34 #
35 #
36 # v.4.1
37 #
38 # Process the command-line arguments.
39 #
40 #
41 if ( $#argv > 0 ) then
42     if ( "$argv[1]" != "-pcte" ) && ( "$argv[1]" != "-link_only" ) then
43         echo ""
44         echo "Error in arguments: $argv[1] was not understood"
45         goto USAGE
46     endif
47     if ( "$argv[1]" == "-pcte" ) setenv PCTE Y
48     if ( "$argv[1]" == "-link_only" ) setenv LINK_ONLY Y
49 endif
50 if ( $#argv > 1 ) then
51     if ( "$argv[2]" != "-pcte" ) && ( "$argv[2]" != "-link_only" ) then
52         echo ""
```

```
53         echo "Error in arguments: $argv[2] was not understood"
54         goto USAGE
55     endif
56     if ( "$argv[2]" == "-pcte" ) setenv PCTE Y
57     if ( "$argv[2]" == "-link_only" ) setenv LINK_ONLY Y
58 endif
59
60 #
61 # Read in the site-dependent data from the 'var' file.
62 #
63 echo ""
64 echo "Define the site-dependent environment variables."
65 echo "-----"
66 echo ""
67 source Build_RLF.var
68
69 if ( $LINK_ONLY == Y ) goto LINK_IT
70
71
72
73 foreach dir ( Rbd1 Rlf Rlf_Gb Lmdl Library_Manager )
74     set echo
75     if ( ! -d $TARGET/$dir ) mkdir -p $TARGET/$dir
76     unset echo >& /dev/null
77 end
78
79
80 #
81 # Build Ada libraries
82 #
83 Build_Ada_Libraries.csh
84 if ($status != 0) exit $status
85
86 #
87 # Perform the build.
88 #
89 echo ""
90 echo "Building RLF Executables"
91 echo ""
92 Build_Rlfdir.csh
93 if ($status != 0) exit $status
94
95 LINK_IT:
96 echo ""
97 echo "Building Lmdl Translator Executable"
98 echo ""
99 Build_Lmdl.csh
100 if ($status != 0) exit $status
101
102 echo ""
103 echo "Building Rbd1 Translator Executable"
104 echo ""
105 Build_Rbd1.csh
106 if ($status != 0) exit $status
```

```
107
108 echo ""
109 echo "Building RLF Library_Manager Executable"
110 echo ""
111 Build_Library_Manager.csh
112 if ($status != 0) exit $status
113
114 echo ""
115 echo "Building Graphical_Browser Executable"
116 echo ""
117 Build_Rlf_Gb.csh
118 if ($status != 0) exit $status
119
120 echo ""
121 echo "RLF Source Code Build Complete"
122 echo ""
123
124
125 echo ""
126 echo "Moving executables to the directory:"
127 echo "      $RLFBINDEST"
128 echo ""
129 if ( ! -d $RLFBINDEST ) mkdir $RLFBINDEST
130 mv -f $TARGET/Library_Manager/Library_Manager $RLFBINDEST
131 mv -f $TARGET/Lmdl/Lmdl $RLFBINDEST
132 mv -f $TARGET/Rndl/Rndl $RLFBINDEST
133 mv -f $TARGET/Rlf_Gb/Graphical_Browser $RLFBINDEST
134
135
136 echo ""
137 echo "Moving the RLF GB resource file (RLF_Browser) to directory: "
138 echo "  $APPDEFAULTS"
139 echo ""
140 if ( ! -d $APPDEFAULTS ) mkdir $APPDEFAULTS
141 cp $RLFBIN/RLF_Browser $APPDEFAULTS/RLF_Browser
142
143 echo ""
144 echo "Moving the RLF GB bitmap files to directory: "
145 echo "  $APPDEFAULTS/bitmaps"
146 echo ""
147 cp -r $RLFBIN/bitmaps $APPDEFAULTS
148
149 echo ""
150 echo "Setting permissions for bitmap files in directory: "
151 echo "  $APPDEFAULTS/bitmaps"
152 echo ""
153 chmod 744 $APPDEFAULTS/bitmaps/*
154
155 if ( $BUILD_SAMPLE_LIB == Y || $BUILD_SAMPLE_LIB == y ) then
156   if ( $PCTE == Y || $PCTE == y ) then
157     echo "Not translating the Animals sample library."
158     echo "Run the appropriate 'esh' script after starting PCTE."
159   else
160     echo ""
```

```
161     echo "Translating the Animals sample library."
162     echo ""
163     pushd $RLFHOME/models/animals > /dev/null
164     set path = ( $RLFBIN $path )
165     Build_Animals_Lib.csh
166     popd > /dev/null
167     if ($status != 0) exit $status
168  endif
169
170 echo ""
171 echo "Installation Complete"
172 echo ""
173 exit 0
174
175 USAGE:
176     echo ""
177     echo "Usage:"
178     echo " ${prog:t}: [-pcte] [-link_only]"
179     echo ""
180     exit 1
181
```

C.2.3 Script: Build_Ada_Libraries.csh

```
1 #!/bin/csh -f
2 #
3 #
4 # Build_Ada_Libraries.csh - RLF installation file for building Ada libraries
5 #
6 #
7
8 #####limit stacksize unlimited
9 #####limit datasize unlimited
10
11 echo ""
12 echo "Making Ada libraries"
13 echo ""
14
15 #
16 # Add the compiler binaries to the path for SERC Ada/Motif
17 # to make the Motif Ada libraries.
18 #
19 set path = ( $COMPILERBIN $path )
20
21 #
22 # Core RLF.
23 #
24 cd $TARGET/Rlf
25 if ( ! -e ada.lib ) then
26   $COMPILERBIN/a.mklib -f . $COMPILERPATH/verdixlib
27   if ($PCTE == y || $PCTE == Y) then
28     $COMPILERBIN/a.path -i $PCTE_ADA
29   endif
30 else
31   echo "Ada library exists in directory:"
32   echo -n " "
33   pwd
34 endif
35
36 #
37 # Modeling language translators.
38 #
39 foreach dir ( Lmdl Rbdl )
40   cd $TARGET/$dir
41   if ( ! -e ada.lib ) then
42     $COMPILERBIN/a.mklib -f . $COMPILERPATH/verdixlib
43     $COMPILERBIN/a.path -i $TARGET/Rlf
44     if ($PCTE == y || $PCTE == Y) then
45       $COMPILERBIN/a.path -i $PCTE_ADA
46     endif
47   else
48     echo "Ada library exists in directory:"
49     echo -n " "
50     pwd
51   endif
52 end
```

```
53
54 #
55 # RLF Library Manager.
56 #
57 cd $TARGET/Library_Manager
58 if ( ! -e ada.lib ) then
59   $ADAMOTIFHOME/sup/AdaMotif.mklib
60   $COMPILERBIN/a.path -i $TARGET/Rlf
61   if ($PCTE == y || $PCTE == Y) then
62     $COMPILERBIN/a.path -i $PCTE_ADA
63   endif
64 else
65   echo "Ada library exists in directory:"
66   echo -n " "
67   pwd
68 endif
69
70 #
71 # RLF Graphical Browser.
72 #
73 cd $TARGET/Rlf_Gb
74 if ( ! -e ada.lib ) then
75   $ADAMOTIFHOME/sup/AdaMotif.mklib
76   $COMPILERBIN/a.path -i $TARGET/Rlf
77   $COMPILERBIN/a.path -i $RGB
78   if ($PCTE == y || $PCTE == Y) then
79     $COMPILERBIN/a.path -i $PCTE_ADA
80   endif
81 else
82   echo "Ada library exists in directory:"
83   echo -n " "
84   pwd
85 endif
86
```

C.2.4 Script: Build_Rlfdir.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 pushd $TARGET/Rlf > /dev/null
6
7 echo ""
8 echo "Establishing soft links to the Rlf source files"
9 echo ""
10 foreach dir ( Common Adaknet Adatau Hybrid Ada_Actions )
11   foreach file ( $RLFCODE/$dir/*.a )
12     set echo
13     if ( ! -e ${file:t} ) ln -s $file ${file:t}
14     unset echo >& /dev/null
15   end
16 end
17 #
18 # ...including the 'C' source files
19 #
20 if ( ! -e support.c ) ln -s $RLFCODE/Common/support.c .
21
22 echo ""
23 echo "Compiling Rlf code"
24 echo ""
25 $CC -c support.c
26
27 #
28 # compiling IO specs for Unix, Pcte or Cais
29 #
30
31 $COMPILE c_interface_spec.a
32   if ($status != 0) exit $status
33
34 if ($PCTE == y || $PCTF == Y) then
35   $COMPILE rlf_text_io_pcte_.a
36     if ($status != 0) exit $status
37   $COMPILE rlf_sequential_io_pcte_.a
38     if ($status != 0) exit $status
39   $COMPILE rlf_direct_io_pcte_.a
40     if ($status != 0) exit $status
41   $COMPILE rlf_pcte_spec.a
42     if ($status != 0) exit $status
43   $COMPILE rlf_pcte_body.a
44     if ($status != 0) exit $status
45   $COMPILE pcte_object_create.a
46     if ($status != 0) exit $status
47   $COMPILE rlf_text_io_pcte.a
48     if ($status != 0) exit $status
49   $COMPILE rlf_sequential_io.a
50     if ($status != 0) exit $status
51   $COMPILE rlf_direct_io.a
52     if ($status != 0) exit $status
```

```
53      $COMPILE pcte_invoke_string.a
54      if ($status != 0) exit $status
55  else
56      $COMPILE rlf_text_io_unix.a
57      if ($status != 0) exit $status
58      $COMPILE rlf_sequential_io_unix.a
59      if ($status != 0) exit $status
60      $COMPILE rlf_direct_io_unix.a
61      if ($status != 0) exit $status
62      $COMPILE rlf_text_io_unix.a
63      if ($status != 0) exit $status
64      $COMPILE rlf_sequential_io.a
65      if ($status != 0) exit $status
66      $COMPILE rlf_direct_io.a
67      if ($status != 0) exit $status
68      $COMPILE unix_invoke_string.a
69      if ($status != 0) exit $status
70  endif
71
72
73      $COMPILE generic_sequences_spec.a
74      if ($status != 0) exit $status
75      $COMPILE generic_sequences_body.a
76      if ($status != 0) exit $status
77      $COMPILE objects_spec.a
78      if ($status != 0) exit $status
79      $COMPILE generic_hash_spec.a
80      if ($status != 0) exit $status
81      $COMPILE generic_hash_body.a
82      if ($status != 0) exit $status
83      $COMPILE system_environment_spec.a
84      if ($status != 0) exit $status
85      $COMPILE system_environment_vads_body.a
86      if ($status != 0) exit $status
87      $COMPILE rlf_globals_spec.a
88      if ($status != 0) exit
89      $COMPILE rlfrc_parser_spec.a
90      if ($status != 0) exit
91      $COMPILE rlfrc_parser_support_spec.a
92      if ($status != 0) exit
93
94
95  if ($PCTE == y || $PCTE == Y) then
96      $COMPILE rlf_constants_pcte.a
97      if ($status != 0) exit
98  else
99      $COMPILE rlf_constants_unix.a
100     if ($status != 0) exit
101  endif
102
103
104      $COMPILE rlf_globals_body.a
105      if ($status != 0) exit
106      $COMPILE rlfrc_scanner_dfa.a
```

```
107      if ($status != 0) exit
108      $COMPILE rlfrc_scanner_io.a
109      if ($status != 0) exit
110      $COMPILE rlfrc_parser_tokens.a
111      if ($status != 0) exit
112      $COMPILE rlfrc_scanner.a
113      if ($status != 0) exit
114      $COMPILE rlfrc_parser_support_body.a
115      if ($status != 0) exit
116      $COMPILE rlfrc_parser_goto.a
117      if ($status != 0) exit
118      $COMPILE rlfrc_parser_shift_reduce.a
119      if ($status != 0) exit
120      $COMPILE rlfrc_parser.a
121      if ($status != 0) exit
122      $COMPILE adaknet_name_types.a
123      if ($status != 0) exit $status
124      $COMPILE fstring_spec.a
125      if ($status != 0) exit $status
126      $COMPILE fstring_body.a
127      if ($status != 0) exit $status
128      $COMPILE labels_spec.a
129      if ($status != 0) exit $status
130      $COMPILE lists_spec.a
131      if ($status != 0) exit $status
132      $COMPILE lists_body.a
133      if ($status != 0) exit $status
134
135
136 if ($PCTE == y || $PCTE == Y) then
137      $COMPILE network_constants_pcte.a
138      if ($status != 0) exit $status
139 else
140      $COMPILE network_constants.a
141      if ($status != 0) exit $status
142 endif
143
144
145      $COMPILE rlf_univ_types.a
146      if ($status != 0) exit $status
147      $COMPILE ranges_spec.a
148      if ($status != 0) exit $status
149      $COMPILE sets_spec.a
150      if ($status != 0) exit $status
151      $COMPILE sets_body.a
152      if ($status != 0) exit $status
153      $COMPILE sorting_spec.a
154      if ($status != 0) exit $status
155      $COMPILE sorting_body.a
156      if ($status != 0) exit $status
157      $COMPILE stacks_spec.a
158      if ($status != 0) exit $status
159      $COMPILE stacks_body.a
160      if ($status != 0) exit $status
```

```
161      $COMPILE strings_spec.a
162      if ($status != 0) exit $status
163      $COMPILE system_dep_spec.a
164      if ($status != 0) exit $status
165      $COMPILE tables_spec.a
166      if ($status != 0) exit $status
167      $COMPILE tables_body.a
168      if ($status != 0) exit $status
169      $COMPILE tau_lists_spec.a
170      if ($status != 0) exit $status
171      $COMPILE tau_lists_body.a
172      if ($status != 0) exit $status
173      $COMPILE agendas_spec.a
174      if ($status != 0) exit $status
175      $COMPILE agendas_body.a
176      if ($status != 0) exit $status
177      $COMPILE customIO_spec.a
178      if ($status != 0) exit $status
179      $COMPILE commonIO_spec.a
180      if ($status != 0) exit $status
181      $COMPILE message_io_spec.a
182      if ($status != 0) exit $status
183      $COMPILE hashmap_spec.a
184      if ($status != 0) exit $status
185      $COMPILE hashmap_body.a
186      if ($status != 0) exit $status
187      $COMPILE hybrid_tables_spec.a
188      if ($status != 0) exit $status
189      $COMPILE hybrid_tables_body.a
190      if ($status != 0) exit $status
191      $COMPILE integer_hybrid_states_spec.a
192      if ($status != 0) exit $status
193      $COMPILE mono_lock_manager_spec.a
194      if ($status != 0) exit $status
195      $COMPILE unique_identifiers_spec.a
196      if ($status != 0) exit $status
197      $COMPILE unique_identifiers_body.a
198      if ($status != 0) exit $status
199      $COMPILE fixed_strings_spec.a
200      if ($status != 0) exit $status
201      $COMPILE fixed_strings_body.a
202      if ($status != 0) exit $status
203      $COMPILE message_io_body.a
204      if ($status != 0) exit $status
205      $COMPILE facts_spec.a
206      if ($status != 0) exit $status
207      $COMPILE filenames_spec.a
208      if ($status != 0) exit $status
209      $COMPILE generic_concepts_spec.a
210      if ($status != 0) exit $status
211      $COMPILE individual_concepts_spec.a
212      if ($status != 0) exit $status
213      $COMPILE label_table_spec.a
214      if ($status != 0) exit $status
```

```
215      $COMPILE label_table_body.a
216      if ($status != 0) exit $status
217      $COMPILE roles_spec.a
218      if ($status != 0) exit $status
219      $COMPILE rolesets_spec.a
220      if ($status != 0) exit $status
221      $COMPILE rolesets_body.a
222      if ($status != 0) exit $status
223      $COMPILE rule_bases_spec.a
224      if ($status != 0) exit $status
225      $COMPILE rule_bases_body.a
226      if ($status != 0) exit $status
227      $COMPILE actions_spec.a
228      if ($status != 0) exit $status
229      $COMPILE actions_body.a
230      if ($status != 0) exit $status
231      $COMPILE schema_spec.a
232      if ($status != 0) exit $status
233      $COMPILE text_hybrid_states_spec.a
234      if ($status != 0) exit $status
235      $COMPILE fact_depend_functions_spec.a
236      if ($status != 0) exit $status
237      $COMPILE fact_depend_spec.a
238      if ($status != 0) exit $status
239      $COMPILE fact_lists_spec.a
240      if ($status != 0) exit $status
241      $COMPILE fact_lists_body.a
242      if ($status != 0) exit $status
243      $COMPILE fact_value_lists_spec.a
244      if ($status != 0) exit $status
245      $COMPILE fact_value_lists_body.a
246      if ($status != 0) exit $status
247      $COMPILE frules_spec.a
248      if ($status != 0) exit $status
249      $COMPILE frules_body.a
250      if ($status != 0) exit $status
251      $COMPILE networks_spec.a
252      if ($status != 0) exit $status
253      $COMPILE networks_body.a
254      if ($status != 0) exit $status
255      $COMPILE non_monotonic_support_spec.a
256      if ($status != 0) exit $status
257      $COMPILE response_schemas_spec.a
258      if ($status != 0) exit $status
259      $COMPILE fact_schemas_spec.a
260      if ($status != 0) exit $status
261      $COMPILE irules_spec.a
262      if ($status != 0) exit $status
263      $COMPILE network_composites_spec.a
264      if ($status != 0) exit $status
265      $COMPILE questions_spec.a
266      if ($status != 0) exit $status
267      $COMPILE adanet_spec.a
268      if ($status != 0) exit $status
```

```
269      $COMPILE composites_spec.a
270      if ($status != 0) exit $status
271      $COMPILE fact_base_schemas_spec.a
272      if ($status != 0) exit $status
273      $COMPILE fact_bases_spec.a
274      if ($status != 0) exit $status
275      $COMPILE fact_parameter_spec.a
276      if ($status != 0) exit $status
277      $COMPILE irule_bases_spec.a
278      if ($status != 0) exit $status
279      $COMPILE qrules_spec.a
280      if ($status != 0) exit $status
281      $COMPILE question_bases_spec.a
282      if ($status != 0) exit $status
283      $COMPILE adanet_composites_spec.a
284      if ($status != 0) exit $status
285      $COMPILE adanet_state_spec.a
286      if ($status != 0) exit $status
287      $COMPILE adanet_state_body.a
288      if ($status != 0) exit $status
289      $COMPILE app_utils_spec.a
290      if ($status != 0) exit $status
291      $COMPILE fact_parameter_list_spec.a
292      if ($status != 0) exit $status
293      $COMPILE fact_parameter_list_body.a
294      if ($status != 0) exit $status
295      $COMPILE fbase_ops_spec.a
296      if ($status != 0) exit $status
297      $COMPILE isa_browser_spec.a
298      if ($status != 0) exit $status
299      $COMPILE qrule_bases_spec.a
300      if ($status != 0) exit $status
301      $COMPILE agg_browser_spec.a
302      if ($status != 0) exit $status
303      $COMPILE basic_config_functions_spec.a
304      if ($status != 0) exit $status
305      $COMPILE q_agendas_spec.a
306      if ($status != 0) exit $status
307      $COMPILE message_config_spec.a
308      if ($status != 0) exit $status
309      $COMPILE debug_spec.a
310      if ($status != 0) exit $status
311      $COMPILE dump_rndl_spec.a
312      if ($status != 0) exit $status
313      $COMPILE message_TAU_components_spec.a
314      if ($status != 0) exit $status
315      $COMPILE truth_maintenance_spec.a
316      if ($status != 0) exit $status
317      $COMPILE message_adv_config_spec.a
318      if ($status != 0) exit $status
319      $COMPILE message_adv_config_body.a
320      if ($status != 0) exit $status
321      $COMPILE librarian_configuration.a
322      if ($status != 0) exit $status
```

```
323      $COMPILE persistence_spec.a
324      if ($status != 0) exit $status
325      $COMPILE static_persistence_spec.a
326      if ($status != 0) exit $status
327      $COMPILE lib_static_persistence_spec.a
328      if ($status != 0) exit $status
329      $COMPILE message_DTAU_components_spec.a
330      if ($status != 0) exit $status
331      $COMPILE inf_hybrid_states_spec.a
332      if ($status != 0) exit $status
333      $COMPILE library_hybrid_states_spec.a
334      if ($status != 0) exit $status
335      $COMPILE library_hybrid_networks.a
336      if ($status != 0) exit $status
337      $COMPILE library_hybrid_state_ops_spec.a
338      if ($status != 0) exit $status
339      $COMPILE sndl_dump_spec.a
340      if ($status != 0) exit $status
341      $COMPILE examine_network_spec.a
342      if ($status != 0) exit $status
343      $COMPILE examine_network_body.a
344      if ($status != 0) exit $status
345      $COMPILE text_state_file_ops_spec.a
346      if ($status != 0) exit $status
347      $COMPILE text_state_ops_spec.a
348      if ($status != 0) exit $status
349      $COMPILE inf_state_ops_spec.a
350      if ($status != 0) exit $status
351      $COMPILE integer_state_ops_spec.a
352      if ($status != 0) exit $status
353      $COMPILE c_interface_body.a
354      if ($status != 0) exit $status
355      $COMPILE labels_body.a
356      if ($status != 0) exit $status
357      $COMPILE strings_body.a
358      if ($status != 0) exit $status
359
360
361  if ($PCTE == y || $PCTE == Y) then
362      $COMPILE system_dep_pcte.a
363      if ($status != 0) exit $status
364  else
365      $COMPILE system_dep_unix.a
366      if ($status != 0) exit $status
367  endif
368
369
370      $COMPILE customIO_body.a
371      if ($status != 0) exit $status
372      $COMPILE commonIO_body.a
373      if ($status != 0) exit $status
374      $COMPILE mono_lock_manager_body.a
375      if ($status != 0) exit $status
376      $COMPILE filenames_body.a
```

```
377      if ($status != 0) exit $status
378      $COMPILE ranges_body.a
379      if ($status != 0) exit $status
380      $COMPILE generic_concepts_body.a
381      if ($status != 0) exit $status
382      $COMPILE individual_concepts_body.a
383      if ($status != 0) exit $status
384      $COMPILE roles_body.a
385      if ($status != 0) exit $status
386      $COMPILE schema_body.a
387      if ($status != 0) exit $status
388      $COMPILE network_composites_body.a
389      if ($status != 0) exit $status
390      $COMPILE adanet_body.a
391      if ($status != 0) exit $status
392      $COMPILE adanet_constr_destr_ops_sp.a
393      if ($status != 0) exit $status
394      $COMPILE adanet_mod_ops_sp.a
395      if ($status != 0) exit $status
396      $COMPILE adanet_predicates_sp.a
397      if ($status != 0) exit $status
398      $COMPILE adanet_query_ops_sp.a
399      if ($status != 0) exit $status
400      $COMPILE changes_sp.a
401      if ($status != 0) exit $status
402      $COMPILE concept_mod_ops_sp.a
403      if ($status != 0) exit $status
404      $COMPILE concept_predicates_sp.a
405      if ($status != 0) exit $status
406      $COMPILE concept_query_ops_sp.a
407      if ($status != 0) exit $status
408      $COMPILE misc_ops_sp.a
409      if ($status != 0) exit $status
410      $COMPILE restrictions_sp.a
411      if ($status != 0) exit $status
412      $COMPILE role_mod_ops_sp.a
413      if ($status != 0) exit $status
414      $COMPILE role_predicates_sp.a
415      if ($status != 0) exit $status
416      $COMPILE role_query_ops_sp.a
417      if ($status != 0) exit $status
418      $COMPILE roleset_mod_ops_sp.a
419      if ($status != 0) exit $status
420      $COMPILE roleset_predicates_sp.a
421      if ($status != 0) exit $status
422      $COMPILE roleset_query_ops_sp.a
423      if ($status != 0) exit $status
424      $COMPILE roleset_spec_ops_sp.a
425      if ($status != 0) exit $status
426      $COMPILE action_mod_ops_sp.a
427      if ($status != 0) exit $status
428      $COMPILE action_predicates_sp.a
429      if ($status != 0) exit $status
430      $COMPILE action_query_ops_sp.a
```

```
431      if ($status != 0) exit $status
432      $COMPILE set_conversions_sp.a
433      if ($status != 0) exit $status
434      $COMPILE states_sp.a
435      if ($status != 0) exit $status
436      $COMPILE subroles_sp.a
437      if ($status != 0) exit $status
438      $COMPILE composites_body.a
439      if ($status != 0) exit $status
440      $COMPILE adanet_composites_body.a
441      if ($status != 0) exit $status
442      $COMPILE app_utils_body.a
443      if ($status != 0) exit $status
444      $COMPILE isa_browser_body.a
445      if ($status != 0) exit $status
446      $COMPILE sndl_dump_body.a
447      if ($status != 0) exit $status
448      $COMPILE agg_browser_body.a
449      if ($status != 0) exit $status
450      $COMPILE facts_body.a
451      if ($status != 0) exit $status
452      $COMPILE fact_depend_functions_body.a
453      if ($status != 0) exit $status
454      $COMPILE non_monotonic_support_body.a
455      if ($status != 0) exit $status
456      $COMPILE response_schemas_body.a
457      if ($status != 0) exit $status
458      $COMPILE fact_schemas_body.a
459      if ($status != 0) exit $status
460      $COMPILE irules_body.a
461      if ($status != 0) exit $status
462      $COMPILE questions_body.a
463      if ($status != 0) exit $status
464      $COMPILE fact_base_schemas_body.a
465      if ($status != 0) exit $status
466      $COMPILE fact_bases_body.a
467      if ($status != 0) exit $status
468      $COMPILE fact_parameter_body.a
469      if ($status != 0) exit $status
470      $COMPILE qrules_body.a
471      if ($status != 0) exit $status
472      $COMPILE basic_config_functions_body.a
473      if ($status != 0) exit $status
474      $COMPILE debug_body.a
475      if ($status != 0) exit $status
476      $COMPILE dump_rbd1_body.a
477      if ($status != 0) exit $status
478      $COMPILE message_TAU_components_body.a
479      if ($status != 0) exit $status
480      $COMPILE truth_maintenance_body.a
481      if ($status != 0) exit $status
482      $COMPILE message_config_body.a
483      if ($status != 0) exit $status
484      $COMPILE persistence_body.a
```

```
485      if ($status != 0) exit $status
486      $COMPILE static_persistence_body.a
487      if ($status != 0) exit $status
488      $COMPILE lib_static_persistence_body.a
489      if ($status != 0) exit $status
490      $COMPILE message_DTAU_components_body.a
491      if ($status != 0) exit $status
492      $COMPILE integer_hybrid_states_body.a
493      if ($status != 0) exit $status
494      $COMPILE text_hybrid_states_body.a
495      if ($status != 0) exit $status
496      $COMPILE fbase_ops_body.a
497      if ($status != 0) exit $status
498      $COMPILE inf_hybrid_states_body.a
499      if ($status != 0) exit $status
500      $COMPILE library_hybrid_states_body.a
501      if ($status != 0) exit $status
502      $COMPILE library_hybrid_state_ops_body.a
503      if ($status != 0) exit $status
504      $COMPILE text_state_file_ops_body.a
505      if ($status != 0) exit $status
506      $COMPILE text_state_ops_body.a
507      if ($status != 0) exit $status
508      $COMPILE inf_state_ops_body.a
509      if ($status != 0) exit $status
510      $COMPILE integer_state_ops_body.a
511      if ($status != 0) exit $status
512      $COMPILE action_operations_spec.a
513      if ($status != 0) exit $status
514      $COMPILE action_operations_body.a
515      if ($status != 0) exit $status
516      $COMPILE action_invocation_spec.a
517      if ($status != 0) exit $status
518      $COMPILE action_routines_spec.a
519      if ($status != 0) exit $status
520      $COMPILE action_routines_body.a
521      if ($status != 0) exit $status
522      $COMPILE display_attr_action_spec.a
523      if ($status != 0) exit $status
524      $COMPILE display_attr_action_body.a
525      if ($status != 0) exit $status
526
527
528 if ($PCTE == y || $PCTE == Y) then
529      $COMPILE display_attr_action_ascii_sp_pcte.a
530      if ($status != 0) exit $status
531      $COMPILE display_attr_action_files_sp_pcte.a
532      if ($status != 0) exit $status
533      $COMPILE display_attr_action_buf_sp_pcte.a
534      if ($status != 0) exit $status
535 else
536      $COMPILE display_attr_action_ascii_sp_unix.a
537      if ($status != 0) exit $status
538      $COMPILE display_attr_action_files_sp_unix.a
```

```
539      if ($status != 0) exit $status
540      $COMPILE display_attr_action_buf_sp_unix.a
541      if ($status != 0) exit $status
542  endif
543
544
545      $COMPILE display_attributes_sp.a
546      if ($status != 0) exit $status
547      $COMPILE export_sp.a
548      if ($status != 0) exit $status
549      $COMPILE extract_action_spec.a
550      if ($status != 0) exit $status
551      $COMPILE extract_action_body.a
552      if ($status != 0) exit $status
553
554
555  if ($PCTE == y || $PCTE == Y) then
556      $COMPILE extract_file_sp_pcte.a
557      if ($status != 0) exit $status
558  else
559      $COMPILE extract_file_sp_unix.a
560      if ($status != 0) exit $status
561  endif
562
563
564      $COMPILE extract_sp.a
565      if ($status != 0) exit $status
566      $COMPILE import_sp.a
567      if ($status != 0) exit $status
568      $COMPILE action_invocation_body.a
569      if ($status != 0) exit $status
570      $COMPILE invoke_sys_string_sp.a
571      if ($status != 0) exit $status
572
573
574  if ($PCTE == y || $PCTE == Y) then
575      $COMPILE invoke_string_sp_pcte.a
576      if ($status != 0) exit $status
577  else
578      $COMPILE invoke_string_sp_unix.a
579      if ($status != 0) exit $status
580  endif
581
582      $COMPILE invoke_ada_proc_sp.a
583      if ($status != 0) exit $status
584
585  popd > /dev/null
```

C.2.5 Script: Build_Lmdl.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 pushd $TARGET/Lmdl > /dev/null
6
7 if ( $LINK_ONLY == Y ) goto LINK_IT
8
9 echo ""
10 echo "Establishing soft links to the LMDL source files"
11 echo ""
12 foreach file ($RLFCODE/Lmdl/*.a)
13     if ( ! -e ${file:t} ) ln -s $file ${file:t}
14 end
15
16 echo ""
17 echo "Compiling Lmdl"
18 echo ""
19
20     $COMPILE std_report_spec.a
21     if ($status != 0) exit $status
22     $COMPILE topsort_spec.a
23     if ($status != 0) exit $status
24     $COMPILE topsort_body.a
25     if ($status != 0) exit $status
26     $COMPILE std_yyval_error_spec.a
27     if ($status != 0) exit $status
28     $COMPILE std_magic_spec.a
29     if ($status != 0) exit $status
30     $COMPILE std_magic_body.a
31     if ($status != 0) exit $status
32     $COMPILE std_output_spec.a
33     if ($status != 0) exit $status
34     $COMPILE std_yyval_error_body.a
35     if ($status != 0) exit $status
36     $COMPILE std_predefined_tree.a
37     if ($status != 0) exit $status
38     $COMPILE lmdl_system_types_spec.a
39     if ($status != 0) exit $status
40     $COMPILE user_types_spec.a
41     if ($status != 0) exit $status
42     $COMPILE user_types_body.a
43     if ($status != 0) exit $status
44     $COMPILE lmdl_attributed_tree_spec.a
45     if ($status != 0) exit $status
46     $COMPILE lmdl_gets.a
47     if ($status != 0) exit $status
48     $COMPILE lmdl_attributed_tree_body.a
49     if ($status != 0) exit $status
50     $COMPILE globals_spec.a
51     if ($status != 0) exit $status
52     $COMPILE support_spec.a
```

```
53      if ($status != 0) exit $status
54      $COMPILE lmdl_puts.a
55      if ($status != 0) exatus
56      $COMPILE lmdl_makes.a
57      if ($status != 0) exit $status
58      $COMPILE support_body.a
59      if ($status != 0) exit $status
60      $COMPILE lmdl_evaluator_spec.a
61      if ($status != 0) exit $status
62      $COMPILE lmdl_dgts_spec.a
63      if ($status != 0) exit $status
64      $COMPILE std_lex_spec.a
65      if ($status != 0) exit $status
66      $COMPILE std_user_pkg.a
67      if ($status != 0) exit $status
68      $COMPILE lmdl_lexdef.a
69      if ($status != 0) exit $status
70      $COMPILE lexacts_spec.a
71      if ($status != 0) exit $status
72      $COMPILE globals_body.a
73      if ($status != 0) exit $status
74      $COMPILE lexacts_body.a
75      if ($status != 0) exit $status
76      $COMPILE lmdl_lex_pkg.a
77      if ($status != 0) exit $status
78      $COMPILE lmdl_dgts_body.a
79      if ($status != 0) exit $status
80      $COMPILE lmdl_evaluator_body.a
81      if ($status != 0) exit $status
82      $COMPILE lmdl_parserdefs.a
83      if ($status != 0) exit $status
84      $COMPILE backend_spec.a
85      if ($status != 0) exit $status
86      $COMPILE backend_interface.a
87      if ($status != 0) exit $status
88      $COMPILE std_parser_spec.a
89      if ($status != 0) exit $status
90      $COMPILE lmdl_parser.a
91      if ($status != 0) exit $status
92      $COMPILE std_boot.a
93      if ($status != 0) exit $status
94      $COMPILE std_report_body.a
95      if ($status != 0) exit $status
96      $COMPILE lmdl_display.a
97      if ($status != 0) exit $status
98
99      $COMPILE hybrid_ops_spec.a
100     if ($status != 0) exit $status
101     $COMPILE hybrid_ops_body.a
102     if ($status != 0) exit $status
103     $COMPILE adaknet_ops_spec.a
104     if ($status != 0) exit $status
105     $COMPILE adaknet_ops_body.a
106     if ($status != 0) exit $status
```

```
107      $COMPILE operations_list_def_spec.a
108      if ($status != 0) exit $status
109      $COMPILE operations_list_def_body.a
110      if ($status != 0) exit $status
111
112      $COMPILE backend_body.a
113      if ($status != 0) exit $status
114
115
116  LINK_IT:
117  echo ""
118  echo "Linking Lmdl"
119  echo ""
120
121  if ($PCTE == y || $PCTE == Y) then
122      $LINK boot -o Lmdl $TARGET/Rlf/support.o \
123                      $LIBEMER $PCTE_ADA/util.o \
124                      $LINK_FLAGS
125      if ($status != 0) exit $status
126  else
127      $LINK boot -o Lmdl $TARGET/Rlf/support.o \
128                      $LINK_FLAGS
129      if ($status != 0) exit $status
130  endif
131  popd > /dev/null
132  exit 0
```

C.2.6 Script: Build_Rbdl.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 pushd $TARGET/Rbdl > /dev/null
6
7 if ( $LINK_ONLY == Y ) goto LINK_IT
8
9 echo ""
10 echo "Establishing soft links to the RBDL source files"
11 echo ""
12 foreach file ($RLFCODE/Rbdl/*.a)
13     if ( ! -e ${file:t} ) ln -s $file ${file:t}
14 end
15
16 echo ""
17 echo "Compiling Rbdl"
18 echo ""
19
20
21     $COMPILE std_yyval_error_spec.a
22         if ($status != 0) exit $status
23     $COMPILE nonstd_magic_spec.a
24         if ($status != 0) exit $status
25     $COMPILE std_magic_body.a
26         if ($status != 0) exit $status
27     $COMPILE std_output_spec.a
28         if ($status != 0) exit $status
29     $COMPILE std_yyval_error_body.a
30         if ($status != 0) exit $status
31     $COMPILE std_predefined_tree.a
32         if ($status != 0) exit $status
33     $COMPILE rbdl_system_types_spec.a
34         if ($status != 0) exit $status
35     $COMPILE user_types_spec.a
36         if ($status != 0) exit $status
37     $COMPILE user_types_body.a
38         if ($status != 0) exit $status
39     $COMPILE rbdl_attributed_tree_spec.a
40         if ($status != 0) exit $status
41     $COMPILE rbdl_gets.a
42         if ($status != 0) exit $status
43     $COMPILE rbdl_attributed_tree_body.a
44         if ($status != 0) exit $status
45     $COMPILE support_spec.a
46         if ($status != 0) exit $status
47     $COMPILE rbdl_puts.a
48         if ($status != 0) exit $status
49     $COMPILE rbdl_makes.a
50         if ($status != 0) exit $status
51     $COMPILE globals_spec.a
52         if ($status != 0) exit $status
```

```
53      $COMPILE globals_body.a
54      if ($status != 0) exit $status
55      $COMPILE support_body.a
56      if ($status != 0) exit $status
57      $COMPILE report_spec.a
58      if ($status != 0) exit $status
59      $COMPILE report_body.a
60      if ($status != 0) exit $status
61      $COMPILE rbd1_evaluator_spec.a
62      if ($status != 0) exit $status
63      $COMPILE rbd1_dgts_spec.a
64      if ($status != 0) exit $status
65      $COMPILE nonstd_lex_spec.a
66      if ($status != 0) exit $status
67      $COMPILE std_user_pkg.a
68      if ($status != 0) exit $status
69      $COMPILE rbd1_lexdef.a
70      if ($status != 0) exit $status
71      $COMPILE lexacts_spec.a
72      if ($status != 0) exit $status
73      $COMPILE lexacts_body.a
74      if ($status != 0) exit $status
75      $COMPILE rbd1_display.a
76      if ($status != 0) exit $status
77      $COMPILE rbd1_lex_pkg.a
78      if ($status != 0) exit $status
79      $COMPILE rbd1_dgts_body.a
80      if ($status != 0) exit $status
81      $COMPILE rbd1_evaluator_body.a
82      if ($status != 0) exit $status
83      $COMPILE rbd1_parserdefs.a
84      if ($status != 0) exit $status
85      $COMPILE std_parser_spec.a
86      if ($status != 0) exit $status
87      $COMPILE rbd1_parser.a
88      if ($status != 0) exit $status
89      $COMPILE besl_v1_string_handler_spec.a
90      if ($status != 0) exit $status
91      $COMPILE besl_v1_string_handler_body.a
92      if ($status != 0) exit $status
93      $COMPILE besl_support_spec.a
94      if ($status != 0) exit $status
95      $COMPILE besl_support_body.a
96      if ($status != 0) exit $status
97      $COMPILE question_hash_types_spec.a
98      if ($status != 0) exit $status
99      $COMPILE question_hash_types_body.a
100     if ($status != 0) exit $status
101     $COMPILE question_hashes.a
102     if ($status != 0) exit $status
103     $COMPILE create_inferencer_support_spec.a
104     if ($status != 0) exit $status
105     $COMPILE create_inferencer_support_body.a
106     if ($status != 0) exit $status
```

```
107      $COMPILE be1.a
108      if ($status != 0) exit $status
109      $COMPILE backend_interface.a
110      if ($status != 0) exit $status
111      $COMPILE nonstd_boot.c
112      if ($status != 0) exit $status
113
114  LINK_IT:
115  echo ""
116  echo "Linking Rbd1"
117  echo ""
118
119  if ($PCTE == y || $PCTE == Y) then
120      $LINK boot -o Rbd1 $TARGET/Rlf/support.o \
121                      $LIBEMER $PCTE_UTIL \
122                      $LINK_FLAGS
123      if ($status != 0) exit $status
124  else
125      $LINK boot -o Rbd1 $TARGET/Rlf/support.o \
126                      $LINK_FLAGS
127      if ($status != 0) exit $status
128  endif
129  popd > /dev/null
130  exit 0
```

C.2.7 Script: Build_Library_Manager.csh

```
1  #!/bin/csh -f
2  #####limit stacksize unlimited
3  #####limit datasize unlimited
4
5  pushd $TARGET/Library_Manager > /dev/null
6
7  if ( $LINK_ONLY == Y ) goto LINK_IT
8
9  echo ""
10 echo "Establishing soft links to the Library Manager source files"
11 echo ""
12 foreach file ( $RLFCODE/Library_Manager/*.a )
13     if ( ! -e ${file:t} ) ln -s $file ${file:t}
14 end
15
16 echo ""
17 echo "Compiling Library Manager"
18 echo ""
19
20     $COMPILE globals_spec.a
21     if ($status != 0) exit $status
22     $COMPILE callbacks_spec.a
23     if ($status != 0) exit $status
24     $COMPILE callbacks_body.a
25     if ($status != 0) exit $status
26     $COMPILE library_manager.a
27     if ($status != 0) exit $status
28
29 LINK_IT:
30 echo ""
31 echo "Linking Library Manager"
32 echo ""
33 if ( $PCTE == y || $PCTE == Y ) then
34     $LINK library_manager -o Library_Manager $TARGET/Rlf/support.o \
35                                         $LIBEMER $PCTE_ADA/util.o \
36                                         $LINK_FLAGS
37     if ($status != 0) exit $status
38 else
39     $LINK library_manager -o Library_Manager $TARGET/Rlf/support.o \
40
41     if ($status != 0) exit $status
42 endif
43 popd > /dev/null
44 exit 0
```

C.2.8 Script: Build_Rlf_Gb.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5
6
7 pushd $TARGET/Rlf_Gb > /dev/null
8
9 if ( $LINK_ONLY == Y ) goto LINK_IT
10
11 echo ""
12 echo "Establishing soft links to the Rlf_Gb source files"
13 echo ""
14
15 set echo
16 foreach file ($RLFCODE/Rlf_Gb/*.a)
17   if ( ! -e ${file:t} ) ln -s $file ${file:t}
18 end
19 unset echo
20
21 echo ""
22 echo "Compiling Rlf_Gb"
23 echo ""
24
25
26 $COMPILE gb_params_spec.a
27   if ($status != 0) exit $status
28 $COMPILE gb_params_body.a
29   if ($status != 0) exit $status
30 $COMPILE gb_instance.a
31   if ($status != 0) exit $status
32 $COMPILE gb_hash.a
33   if ($status != 0) exit $status
34 $COMPILE gb_globals.a
35   if ($status != 0) exit $status
36 $COMPILE gb_dynamic_menus_spec.a
37   if ($status != 0) exit $status
38 $COMPILE gb_agg_browser_spec.a
39   if ($status != 0) exit $status
40 $COMPILE gb_callbacks_spec.a
41   if ($status != 0) exit $status
42 $COMPILE gb_static_menus_spec.a
43   if ($status != 0) exit $status
44 $COMPILE gb_static_cmds_spec.a
45   if ($status != 0) exit $status
46 $COMPILE gb_dyn_node_menus_spec.a
47   if ($status != 0) exit $status
48 $COMPILE gb_utils_spec.a
49   if ($status != 0) exit $status
50 $COMPILE gb_history.a
51   if ($status != 0) exit $status
52 $COMPILE gb_make_view.a
```

```
53      if ($status != 0) exit $status
54      $COMPILE gb_infer_dtau_spec.a
55      if ($status != 0) exit $status
56      $COMPILE gb_infer.a
57      if ($status != 0) exit $status
58      $COMPILE gb_infer_dtau_body.a
59      if ($status != 0) exit $status
60
61      $COMPILE gb_cb_suppress_spec.a
62      if ($status != 0) exit $status
63      $COMPILE gb_cb_suppress_gen2.a
64      if ($status != 0) exit $status
65      $COMPILE gb_cb_suppress_gen.a
66      if ($status != 0) exit $status
67
68      $COMPILE gb_cb_suppress_body.a
69      if ($status != 0) exit $status
70
71      $COMPILE gb_agg_browser_body.a
72      if ($status != 0) exit $status
73      $COMPILE gb_callbacks_body.a
74      if ($status != 0) exit $status
75      $COMPILE gb_dynamic_menus_body.a
76      if ($status != 0) exit $status
77      $COMPILE gb_static_menus_body.a
78      if ($status != 0) exit $status
79      $COMPILE gb_static_cmds_body.a
80      if ($status != 0) exit $status
81      $COMPILE gb_dyn_node_menus_body.a
82      if ($status != 0) exit $status
83      $COMPILE gb_utils_body.a
84      if ($status != 0) exit $status
85      $COMPILE gb_main.a
86      if ($status != 0) exit $status
87
88  LINK_IT:
89  echo ""
90  echo "Linking Rlf_Gb"
91  echo ""
92  if ($PCTE == y || $PCTE == Y) then
93      $LINK Gb_Main -o Graphical_Browser $TARGET/Rlf/support.o \
94                                         $RGB_OBJ \
95                                         $LIBX \
96                                         $LIBEMER $PCTE_UTIL \
97                                         $LINK_FLAGS
98      if ($status != 0) exit $status
99  else
100     $LINK Gb_Main -o Graphical_Browser $TARGET/Rlf/support.o \
101                                         $RGB_OBJ \
102                                         $LIBX \
103                                         $LINK_FLAGS
104     if ($status != 0) exit $status
105  endif
106
```

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107 popd > /dev/null
108 exit 0

C.3 Scripts for Building Sample Networks

C.3.1 Script: Build_Ada_X.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds the "Paramax STARS Ada/X" library for the RLF.
7 #
8
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14     echo ""
15     echo "Specify path to the RLF libraries"
16     echo "(e.g. /afs/reston/see/rif/4.0/Libraries)"
17     echo ""
18     echo -n " RLF_LIBRARIES = "
19     setenv RLF_LIBRARIES $<
20     echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES/Text/ada_x ) mkdir -p $RLF_LIBRARIES/Text/ada_x
27 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
28
29 echo ""
30 echo "Initializing text files"
31 echo ""
32 cp -r Text/* $RLF_LIBRARIES/Text/ada_x
33
34 echo ""
35 echo "Building library model from ada_x.lmdl"
36 echo ""
37 Lmdl ada_x.lmdl
38
39 foreach i (*.rbdl)
40     echo ""
41     echo "Creating Inferencer from $i"
42     echo ""
43     Rbdl < $i
44 end
```

C.3.2 Script: Build_Animals.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds a demonstration animals library for the RLF.
7 #
8
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14     echo ""
15     echo "Specify path to the RLF libraries"
16     echo "(e.g. /afs/reston/see/rlf/4.0/Libraries)"
17     echo ""
18     echo -n " RLF_LIBRARIES = "
19     setenv RLF_LIBRARIES $<
20     echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES ) mkdir $RLF_LIBRARIES
27 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
28 if ( ! -d $RLF_LIBRARIES/Text ) mkdir $RLF_LIBRARIES/Text
29 if ( ! -d $RLF_LIBRARIES/Text/animals ) mkdir -p $RLF_LIBRARIES/Text/animals
30
31
32
33 echo ""
34 echo "Initializing text files"
35 echo ""
36 cp Text/* $RLF_LIBRARIES/Text/animals
37
38 echo ""
39 echo "Building Lmdl Network from animals.lmdl"
40 echo ""
41 Lmdl animals.lmdl
```

C.3.3 Script: Build_Asw_Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds a sample Anti-Submarine Warfare library for the RLF.
7 #
8 #
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14     echo ""
15     echo "Specify path to the RLF libraries"
16     echo "(e.g. /afs/reston/see/rlf/4.0/Libraries)"
17     echo ""
18     echo -n " RLF_LIBRARIES = "
19     setenv RLF_LIBRARIES $<
20     echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES/Text/asw ) mkdir -p $RLF_LIBRARIES/Text/asw
27 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
28
29 echo ""
30 echo "Initializing text files"
31 echo ""
32 cp Text/* $RLF_LIBRARIES/Text/asw
33
34 echo ""
35 echo "Building library model from asw.lmdl"
36 echo ""
37 Lmdl asw.lmdl
```

C.3.4 Script: Build_Common_Data_Model.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds a demo Common Data Model library for the RLF.
7 #
8 #
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14     echo ""
15     echo "Specify path to the RLF libraries"
16     echo "(e.g. /afs/reston/see/rlf/4.0/Libraries)"
17     echo ""
18     echo -n " RLF_LIBRARIES = "
19     setenv RLF_LIBRARIES $<
20     echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES/Text/satText ) mkdir -p $RLF_LIBRARIES/Text/satText
27 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
28
29 echo ""
30 echo "Initializing text files"
31 echo ""
32 cp Text/* $RLF_LIBRARIES/Text/satText
33
34 echo ""
35 echo "Building LMDL Network from cdm.lmdl"
36 echo ""
37 Lmdl < common_data_model.lmdl
```

C.3.5 Script: Build_Demo_Actions.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds a demonstration actions library for the RLF.
7 #
8 #
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14   echo ""
15   echo "Specify path to the RLF libraries"
16   echo "(e.g. /afs/reston/see/rlf/4.0/Libraries)"
17   echo ""
18   echo -n " RLF_LIBRARIES = "
19   setenv RLF_LIBRARIES $<
20   echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES/Text/demo_actions ) then
27   mkdir -p $RLF_LIBRARIES/Text/demo_actions
28 endif
29 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
30
31 echo ""
32 echo "Initializing text files"
33 echo ""
34 cp -r Text/* $RLF_LIBRARIES/Text/demo_actions
35
36 echo ""
37 echo "Building LMDL Network from demo_actions.lmdl"
38 echo ""
39 Lmdl demo_actions.lmdl
```

C.3.6 Script: Build_Move_Domain.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds the Cathy Lin's Window Manager library for the RLF.
7 #
8 #
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14   echo ""
15   echo "Specify path to the RLF libraries"
16   echo "(Defaults to $RLF/Libraries)"
17   echo ""
18   echo -n " RLF_LIBRARIES = "
19   setenv RLF_LIBRARIES $<
20   echo ""
21   if ($RLF_LIBRARIES ==) setenv RLF_LIBRARIES $RLF/Libraries
22 endif
23
24 echo ""
25 echo "Creating required sub-directories"
26 echo ""
27 if ( ! -d $RLF_LIBRARIES/Text/wm_move ) mkdir -p $RLF_LIBRARIES/Text/wm_move
28 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
29
30 echo ""
31 echo "Initializing text files"
32 echo ""
33 cp -r Text/* $RLF_LIBRARIES/Text/wm_move
34
35 echo ""
36 echo "Building LMDL Network from move_domain.lmdl"
37 echo ""
38 Lmdl move_domain.lmdl
39
40 foreach i (*.rbd1)
41   echo ""
42   echo "Creating Inferencer from $i"
43   echo ""
44   Rbd1 < $i
45 end
```

C.3.7 Script: Build_SW_Tech.Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds the Software Technology library for the RLF.
7 #
8
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14   echo ""
15   echo "Specify path to the RLF libraries"
16   echo "(Defaults to $RLF/Libraries)"
17   echo ""
18   echo -n " RLF_LIBRARIES = "
19   setenv RLF_LIBRARIES $<
20   echo ""
21   if ($RLF_LIBRARIES ==) setenv RLF_LIBRARIES $RLF/Libraries
22 endif
23
24 echo ""
25 echo "Creating required sub-directories"
26 echo ""
27 if ( ! -d $RLF_LIBRARIES/Text/sw_tech ) mkdir -p $RLF_LIBRARIES/Text/sw_tech
28 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
29
30 echo ""
31 echo "Initializing text files"
32 echo ""
33 cp -r Text/* $RLF_LIBRARIES/Text/sw_tech
34
35 echo ""
36 echo "Building LMDL Network from sw_tech.lmdl"
37 echo ""
38 Lmdl sw_tech.lmdl
```

C.3.8 Script: Build_Sort_And_Search_Lib.csh

```
1 #!/bin/csh -f
2 #####limit stacksize unlimited
3 #####limit datasize unlimited
4
5 #
6 # This script builds the "Sort and Search Algorithms" library for the RLF.
7 #
8
9 #
10 # Locate the RLF Libraries
11 #
12 setRLF_LIBRARIES:
13 if (! $?RLF_LIBRARIES) then
14   echo ""
15   echo "Specify path to the RLF libraries"
16   echo "(e.g. /afs/reston/see/rlf/4.0/Libraries)"
17   echo ""
18   echo -n " RLF_LIBRARIES = "
19   setenv RLF_LIBRARIES $<
20   echo ""
21 endif
22
23 echo ""
24 echo "Creating required sub-directories"
25 echo ""
26 if ( ! -d $RLF_LIBRARIES/Text/sort_and_search ) \
27   mkdir -p $RLF_LIBRARIES/Text/sort_and_search
28 if ( ! -d $RLF_LIBRARIES/Taustuff ) mkdir $RLF_LIBRARIES/Taustuff
29
30 echo ""
31 echo "Initializing text files"
32 echo ""
33 cp -r Text/* $RLF_LIBRARIES/Text/sort_and_search
34
35 echo ""
36 echo "Building library model from sort_and_search.lmdl"
37 echo ""
38 Lmdl sort_and_search.lmdl
39
40 foreach i (*.rbdl)
41   echo ""
42   echo "Creating Inferencer from $i"
43   echo ""
44   Rbdl < $i
45 end
```